The Mining Journal
Established 1835
Railway & Commercial Gazette

Vol. CCXLIV No. 6245 LONDON, APRIL 29, 1955 PRICE 8d.

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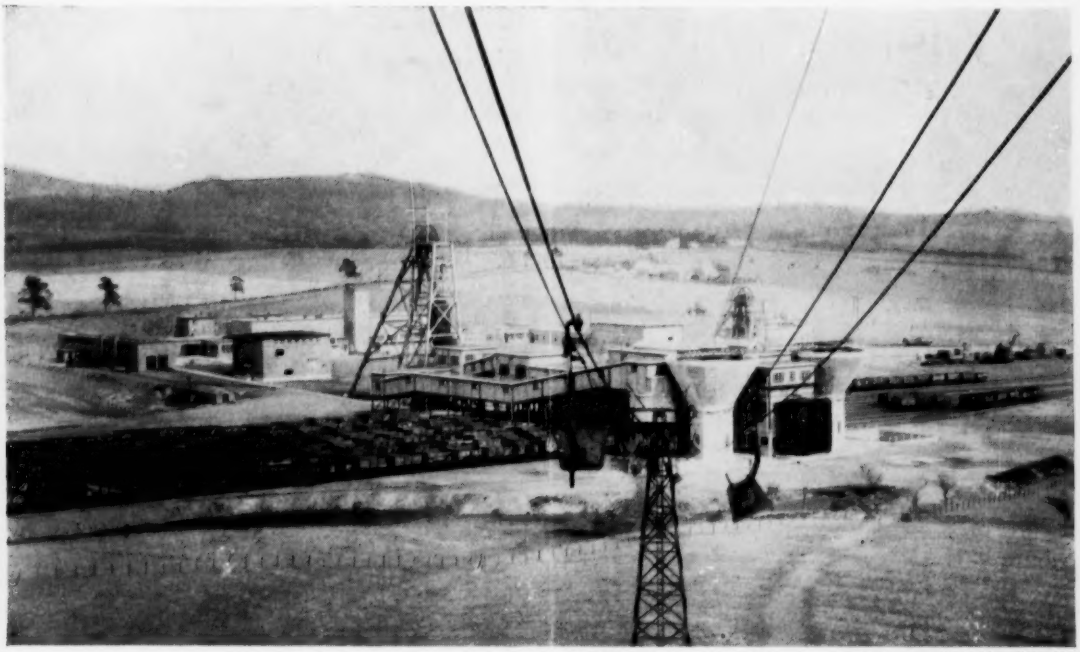

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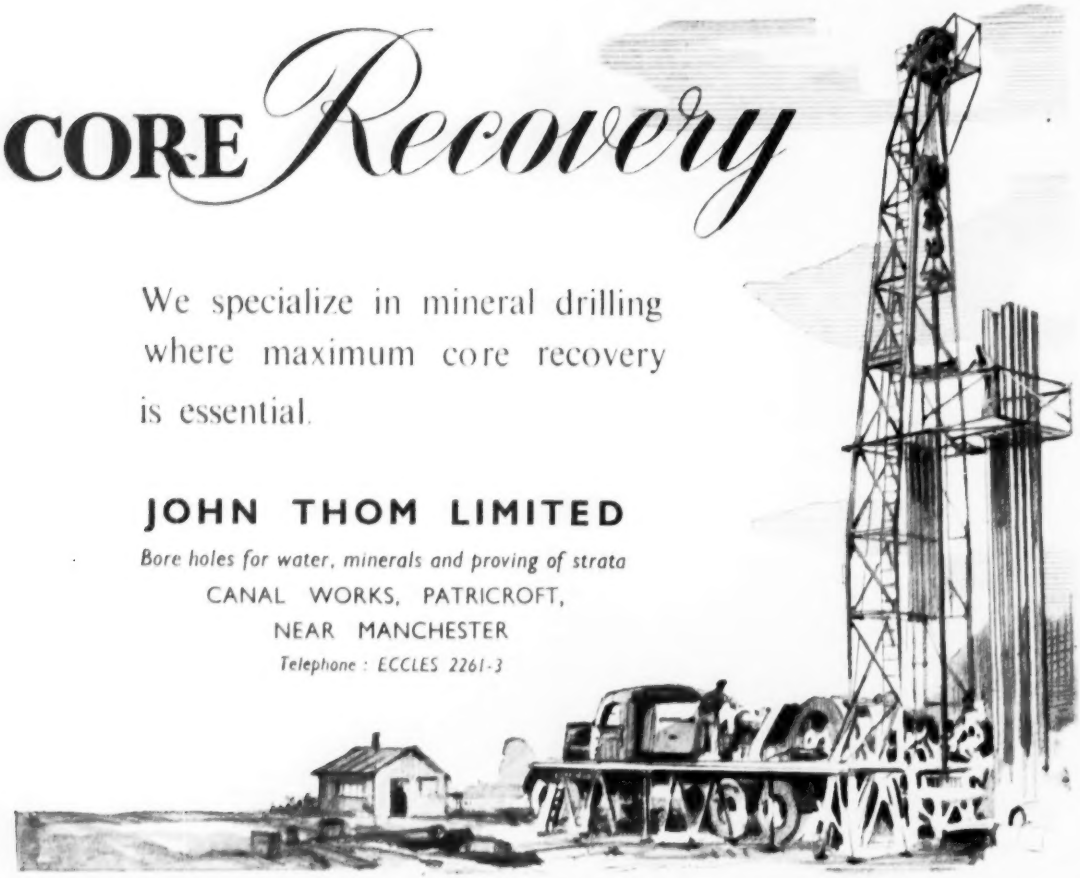

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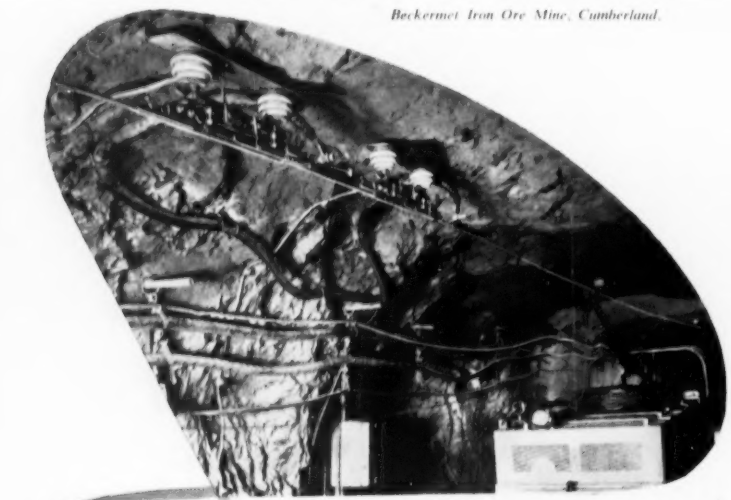

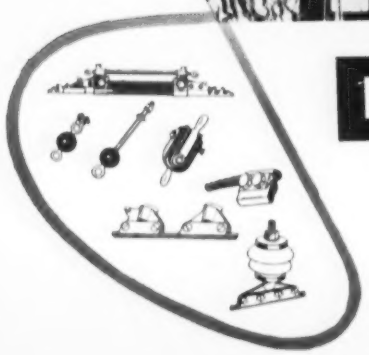

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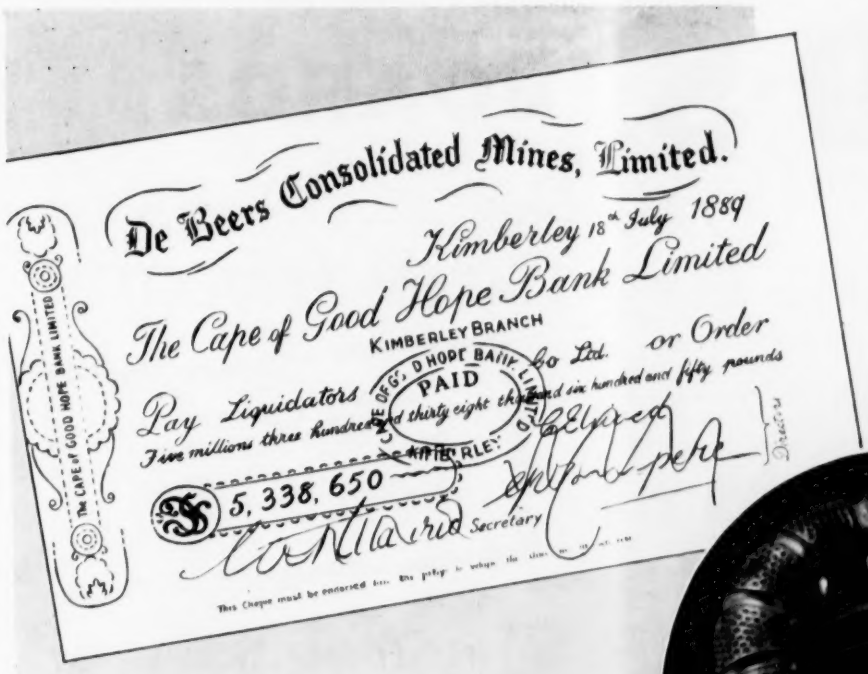

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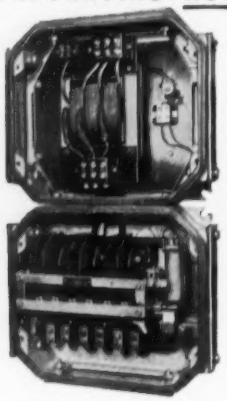

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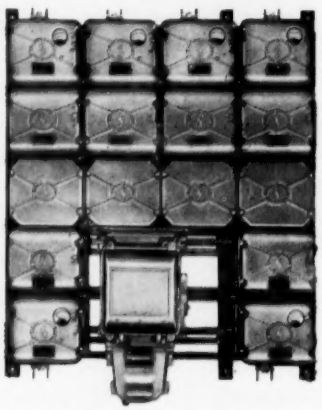

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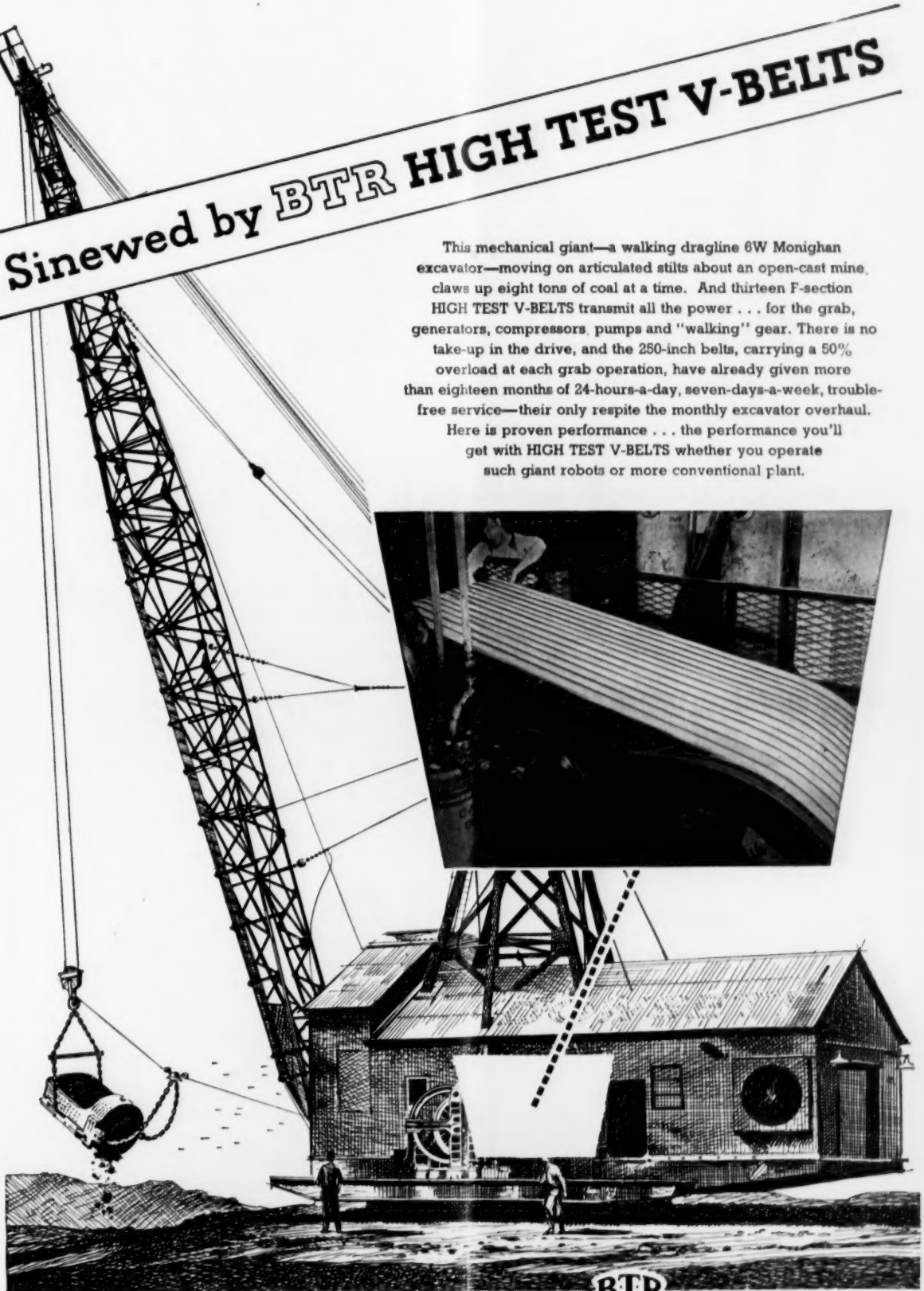

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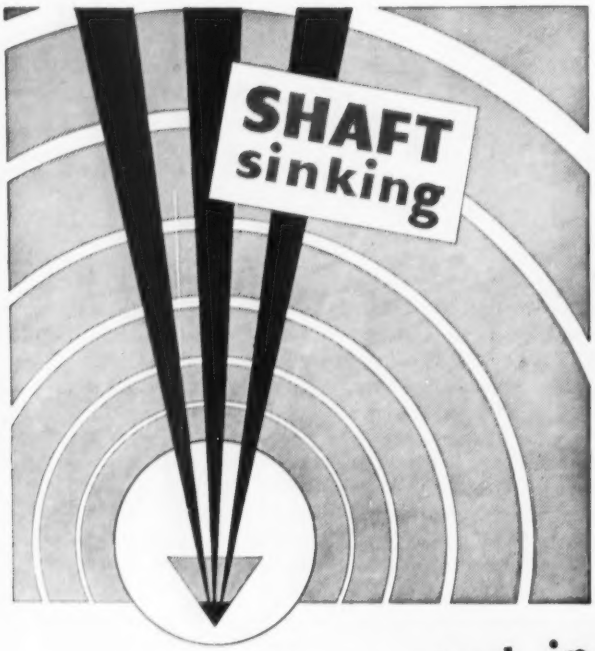

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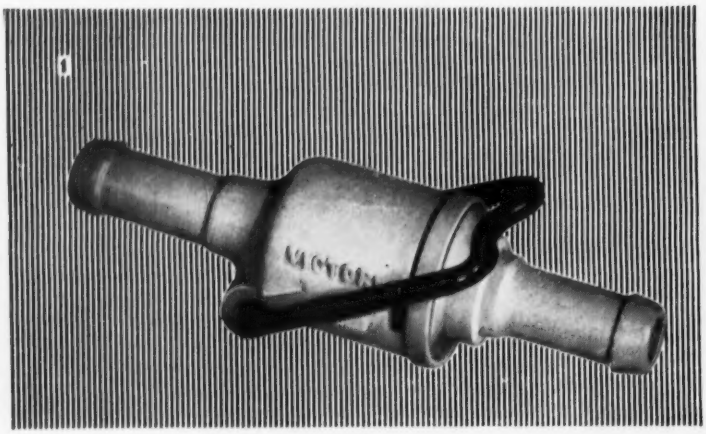

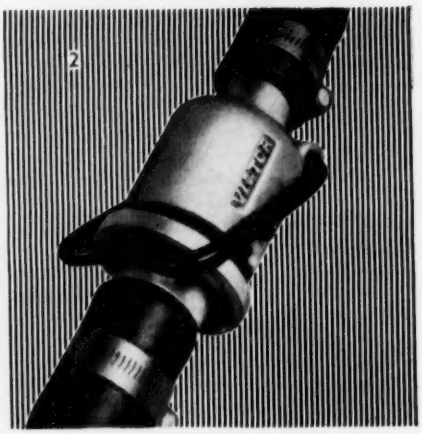

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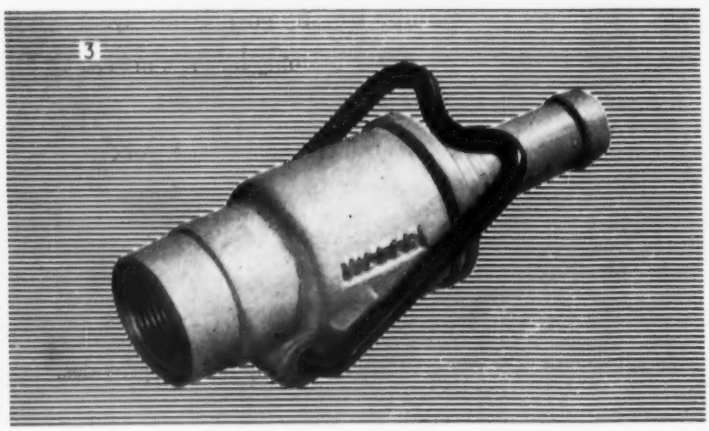

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NOTES AND COMMENTS

Criticism of Australian Uranium Grade Requirements

A party of nine American uranium specialists is visiting the uranium fields of Australia, and the leader has expressed the opinion that the Government's ideas in dealing with prospecting companies are wrong. The view stated is that Government was keen to attract big capital, which might, or might not, produce results, and small companies are not encouraged, whereas American policy is to encourage many small discoveries by many small, aggressive companies, with the objective of producing much uranium quickly. It was considered that the standard of ore demanded was too high with the result that a much higher grade was necessary for payability than is the case in Canada and the United States.

This view may be questioned. Uranium mining is comparable to gold mining; the small producer cannot afford to erect a treatment plant, and such small gold producers have been catered for by Government operated mills. Until it is known with some definiteness, what ore may become available from small producers the question of treatment plants must be in abeyance, and the mining industry is, at present, in this stage. Treatment plants are costly, and methods of treatment vary from one locality to another. Furthermore, very long distances are involved for road transport and it is very essential that the most suitable locations should be selected for central treatment plants to receive ore from small producers.

Moves are now in progress for combination of individual companies in particular localities with the object of central plant construction, should this be warranted by development. A second treatment plant is foreshadowed in the Northern Territory, and if exploratory work by Mary Kathleen Uranium Ltd., in which Rio Tinto Ltd. has secured a controlling interest, operating in the Mount Isa-Cloncurry district of North Queensland, is successful, a treatment plant would be erected in that centre. Progress must necessarily be slow in the provision of treatment facilities.

A factor operating against the small company is the policy of announcing high values in uranium oxide; when such high developmental values are followed by the inevitably much lower values of ore shipped for treatment, disappointment of shareholders reacts against the payment of call money for the furthering of the enterprise. In view of the need for proving of reserves and ore treatment, and the high cost of plant provision and, a very important factor, road construction, the criticism at this stage seems hardly fair.

Impact of Nuclear Energy on Metals

That a major stimulus to the demand for many metals is likely to result from the development of nuclear energy for peacetime purposes is one of the conclusions reached by the Nuclear Energy Research Bureau, a private U.S. organization studying the economic effects of atomic energy.

In its recent report entitled "The impact of atomic energy on the metal industries," the view is taken that—depending on the type of reactors to be built—the minor metals such as beryllium, hafnium, lithium, and zirconium will gain in commercial importance. Steel may be expected to be used in considerable tonnages for constructional work but, relatively, it is believed that it will play a lesser role than other metals. Aluminium will be wanted as a light construction material and also for electrical distribution along with copper. Lead will be required in considerable amounts for shielding purposes.

Nuclear development will require supplies of metals able to withstand high temperature and corrosion by strong chemicals and this, it is believed, will lead to increasing competition between alloys and cermets. The survey presented by the Nuclear Energy Research Bureau stresses that the growth of atomic power will expand the demand for metals and alloys having special characteristics. In this connection it is pointed out that zirconium and beryllium will be used in nuclear reactors as moderator materials, hafnium and boron as control materials, while uranium, thorium and plutonium will be needed as fuels and/or fuel sources. Liquid sodium and potassium will probably serve, in some instances at any rate, as coolants.

Dealing with lead the report states that its density gives it a big advantage over other metals for shielding from radiation. At present lead is being used in considerable quantities for shielding purposes. Other important nuclear outlets for lead will be for containers in which radio-isotopes can be shipped. Lead bricks are now being manufactured and sold for use in building protective walls around areas where there is a danger from radiation. Unofficial estimates of the tonnage of lead currently used for shielding vary between 10,000 tons and 20,000 tons and although this is insignificant in terms of the total lead consumption, there are some authorities in the U.S.A. who think that the atomic energy programme will, in time, become an important market outlet for the metal.

In its conclusion the report indicates that metal developments in connection with nuclear energy are going ahead much more rapidly than many realized and that the advent of the atomic age may well bring about a revolution in the mining of low cost minerals.

Nuclear Metals Boost Toronto Share Values

Speculative fever on the Toronto Stock Exchange has recently fastened on what are taken to be the newer minerals of the atomic age, notably lithium and columbium. Even uranium has become relatively a back number, partly because Ottawa officials continue to express doubts about the outlook for uranium when the Government's present price guarantees expire in 1962.

The boom in mining generally has outstripped even the boom in oils which developed in 1947 ,and trading in Toronto in March exceeded all previous records in the Exchange's 102-year history, reaching 192,000,000 shares and nearly $265,000,000. While the average price is about $1.25 a share, the recent activity is nevertheless impressive.

The enthusiasm being shown in the search for minerals was begun by the uranium developments in the Algoma Basin, described in *The Mining Journal* of March 11 and April 8. Such propreties as Algom and Pronto were involved and participation by the Rio Tinto organization—the agreement between Rio Tinto and Algom Uranium was discussed in our issue of February 11—was a significant indication of confidence in the future of uranium.

In the meantime, properties in the Beaverlodge district of Northern Saskatchewan have been relatively neglected and only recently has speculation tended to turn back to this area which, with Gunnar Mines and the government-owned Eldorado Mining, began the first uranium boom early in 1953.

The Oka area of Quebec is now of interest as a potential producers of columbium, and Molybdenum Corporation, United States, holds major interests in the district. When two Canadian mining companies, Coulee Lead and Zinc, and Headway Red Lake Gold, reported an estimated 10,000,000 tons of ore averaging 0.46 per cent columbium pentoxide valued at $31,000,000, the prices of their shares rose approximately tenfold. Companies with columbium properties under development near North Bay and Sudbury, Ontario have shared in the boom.

Interest in lithium was heightened by the recent listing on the Toronto market of Quebec Lithium Corporation, which is expected to start production late this year from its property near Amos, Quebec. The deposit of 15,000,000 tons is claimed to be the largest of its kind in the world. Quebec Lithium is to sell 165 tons of concentrates daily for five years to Lithium Corporation of the U.S. which is building a new $7,000,000 refinery. About 40 mining companies have interests in this area.

Extraction Metallurgy and the Chemical Engineer

In making his presidential address last Tuesday before members of the Institution of Chemical Engineers, Sir Harold Hartley spoke of the increasing scope which he foresaw for the chemical engineer in the future evolution of the techniques of extraction metallurgy. In view of the ever growing need for working lower grade ores, often containing very finely disseminated minerals, Sir Harold's remarks, which we give below, will be of interest to those who may feel that the chemical engineer has an important contribution to make to the solution of many of the problems of the modern mill manager.

We are living more than ever in a machine age. Everything is being mechanized to save human labour and effort and speed up productivity. With that goes an increasing demand for metals, and in spite of alternatives like plastics and bonded materials and the use of scrap the demands for virgin metal are rising. There is also the increasing use of new metals like titanium, zirconium and beryllium.

At the same time many of the richer ore deposits are being depleted and we are dependent more and more on lower grade ores often containing a mixture of minerals which are very finely disseminated. For the treatment of these the older physical methods of ore dressings producing concentrates for smelting are proving inadequate, and they are now being supplemented by various chemical engineering techniques.

There are two main developments, first the recent extensions of the old method of leaching the ores or the tailings from previous extractions with solutions, sometimes under pressure, to dissolve out the metal contents, and secondly the treatment of the ores in a fluidized bed.

The advantage of the leaching process is that it can be used for very low grade ores and allows the separation of different metals by a variety of different methods, precipitation, electrolysis, solvent extraction or extraction by ion exchange resins. Thus uranium is recovered from the tailings on the Rand by leaching with sulphuric acid and ion exchange. Manganese can be recovered from low grade ores or open-hearth slags by leaching with sulphur dioxide, or by preliminary roasting in a reducing atmosphere followed by leaching with ammonia and carbon dioxide or with nitric acid. Nickel sulphide concentrates are being leached with aqueous ammonia and oxygen under pressure giving ferric hydroxide and a solution of the ammines of nickel, cobalt and copper from which they can be separated. A large ore deposit containing less than one per cent of copper oxide is being leached with sulphuric acid.

The fluidized bed method of treating ores under controlled temperature conditions with various gases also offers a number of possibilities. Iron oxide can be reduced to magnetite for magnetic extraction and commercial plants already exist for using this technique for roasting pyrites. Copper nickel and cobalt ores can be converted to sulphates or chlorides by treatment with sulphur dioxide or chlorine in a fluidized bed, followed by leaching with water. Manganese in low grade ores can also be converted to sulphate in the same way.

Another important aspect of the chemical approach to problems arising in ore treatment is the extraction of metals from the slimes that are often unavoidable and may carry sufficient of the metals to prevent the economic exploitation of a low grade deposit. Selective flocculants are giving promising results and the polyvalent ions are being used as flocculants in the recovery of uranium from large quantities of slimes from the treatment of Florida phosphates.

Another process under development is the extraction of gold from cyanide solutions by active carbon which would effect a considerable economy in cyanide and might avoid a considerable capital expenditure on thickeners and filters. Molybdenum can be separated by a similar method.

Hitherto most of the development work in this new field has been done in the United States and Canada where the exploitation of mineral wealth is a major part of the economy. But it is essential that Britain with her large mining interests should keep abreast of progress. This seems to me to involve a new approach to technological education in the field of mining and extractive metallurgy.

In the United States at Colombia and M.I.T. mining engineering is kept separate from mineral engineering which includes all processes of ore treatment and extractive metallurgy, in which chemical engineering techniques are now so intimately involved.

Some such innovation is needed here and it is suggested that some universities should establish departments of mineral processing and extractive metallurgy working in close touch with the departments of chemical engineering.

This new field is so wide and of such commercial importance that there is a strong case for the establishment of a national institute responsible for research and development in mechanical ore treatment and extractive metallurgy similar to the Bureau of Mines of the U.S.A. and the Department of Mines and Technical Surveys in Canada.

Western United States

(From Our Own Correspondent)

Portland, Oregon. April 20.

Industry throughout the country is watching negotiations between the United Automobile Workers and General Motors, most important feature of which is a guaranteed annual wage. Mine, Mill and Smelter Workers' Union has indicated that it will make similar demands if U.A.W. meets with any measure of success. While attacks by the National Labour Relations Board against unions that retained known Communist officers were stymied by the courts, they had the effect, along with pressure from within the union, that Maurice E. Travis, most controversial figure in Mine-Mill, resigned his position as secretary and it is indicated that he will not seek a high office in the organization, at least not in the next election. It seems to be a case of "the devil was sick" and it will be interesting to watch what may happen if the storm blows over and the devil gets well. There is no doubt that Mr. Travis's dissociation will be to the benefit of the union, in the eyes of the public at least.

THE COPPER INDUSTRY

The present copper situation is the cause of some disquiet in the industry. When consumers become aware of an easing of the supply situation, now under way through increased production, the price, which many consider to be out of line at 36 c., seems destined to fall. The reaction is looked for in the late summer or fall. Meanwhile there is the danger that copper may be priced out of the market for some uses and that consumers may turn to aluminium.

Consolidated Copper Mines, Nevada, reported 1954 production as 14,800 tons of copper, a decrease of 20 per cent from 1953, a decrease in the grade of the ore treated accounting for the lower production. Relying on government contracts made in 1952 Copper Mines has been mining a lower grade of ore at its Morris and Brooks pits than had every been attempted before and with a recovery of only 11½ lb. of copper per ton of ore may have set a record for this type of operation.

At the neighbouring Kennecott the Deep Ruth project has been underway since 1951 to prepare this former open pit area for block caving. In the course of this development an ore body, estimated at 1,000,000 tons, was encountered and found to be of sufficiently better grade than the main body to allow it to be accorded special treatment in development and mining. Pending exploitation of this new deposit, the "Minnesota-Hi," the mining of the main ore body will be deferred as the block caving would interfere with the efficient removal of the better grade ore.

ENCOURAGEMENT FOR LEAD AND ZINC

The zinc industry is encouraged by the present boom in auto construction, presently at the rate of 9,000,000 cars per year, especially as the cars of 1955 are using far more zinc in die castings than any previous models. Production of zinc in January showed an increase of 15 per cent over January of 1954.

A Congressional committee consisting of 12 Republicans and 11 Democrats has been organized to work for some relief for the lead and zinc industry other than the stockpiling programme instituted last year. This is an independent committee, informally organized, under the chairmanship of Congressman Dawson of Utah, a leading lead producing state. It has no connection with the Senate sub-committee recently charged with an investigation of the efficiency of the stockpile programme as a relief to the industry. Considering the President's obdurate attitude toward any increase in tariffs one can hardly predict a successful outcome of the committee's efforts.

American Smelting and Refining Co. is planning the reopening of its Ground Hog unit in New Mexico after an idleness of two years. In full-scale operation Ground Hog employed a crew of 700 men but under the resumption development work will be curtailed and emphasis placed on extracting ore already blocked out.

MISCELLANEOUS

Homestake Mining Co., largest gold mine in the United States, reports that during 1954 it attained an efficiency of operation through improved stoping methods and crushing and grinding practice which enabled it to more than offset a higher wage scale and increased costs in supplies and equipment. Cost of mining was maintained at the same level as in 1953 but milling was reduced. A deep level programme of sinking two of the major shafts to the 4,850 level and an underground shaft from that level is under way.

New Idria Mining and Chemical Co., long associated with quicksilver production, has been diversifying its interests lately. Most recent acquisition is the purchase of Strawberry Tungsten Mines in California. Strawberry has a production exceeding $1,000,000 annually and has been recovering in excess of one unit per ton.

Another uranium rush seems to be under way in Northeastern Washington, on land on and in the vicinity of the Spokane Indian Reservation, not far from the Canadian border. Shipments from the Midnight mine over a period of several months to the depot at Salt Lake City have averaged .285 U308 and have brought a settlement of $44 per ton. The Midnight is on the reservation and the Evergreen, site of a new high grade discovery, is about 25 miles easterly and outside of the boundaries. Phelps-Dodge Corporation and Grandview Mines are reported to have taken extensive leases in this area and practically all available ground has been staked.

HYDRAULIC TRANSPORT—III

Degradation and Wear in Hydraulic Transport Systems

If suitable instruments to measure concentration and velocity were available, their use might greatly facilitate an increase in the throughput of a hydraulic transport system. The following article, the conclusion of three describing the hydraulic transport of solid materials in pipes, discusses methods of measuring conditions within pipelines and of ascertaining the degradation of transported material and wear of plant. The article is condensed from a paper by R. C. Worster, B.Sc.(Eng.), and D. F. Denny, B.Sc.(Eng.), Ph.D., presented to the Institution of Mechanical Engineers on March 25, 1955.

In view of the relative ease with which solids are accelerated in water, a Venturi-type nozzle was tried in a vertical pipe on the 3-in. coal system. Handling water alone it was found to have a discharge coefficient of 0.95 and, when handling coal-water mixtures at speeds down to 1½ ft. per sec., the discharge coefficient fell to 0.93±2.6 per cent if the head differential was measured in ft. of water. If, however, the differential was measured in ft. of mixture density, the discharge coefficient became 0.955±2.2 per cent. This suggests that mixture density should be used rather than liquid density in calculating the differential on the nozzle.

CONCENTRATION MEASUREMENT

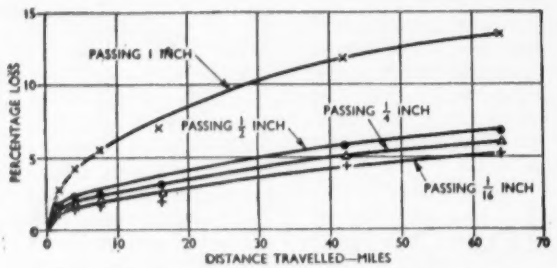
Concentration can, of course, be measured by sampling the delivery, but what is really wanted is an instrument which be can be fitted at any place in the pipeline to indicate the concentration present there (which is greater than the concentration delivered). As far back as 1948, one company had developed electrical-conductivity methods of measuring the proportion of air bubbles in a flowing air-water mixture and the same technique was applied to the measurement of the concentration of gravel and sand present in a horizontal pipe. A special shape of electrode was found to make the instrument insensitive to the actual position of the solids in the pipeline.

Recently a commercial device working on this principle has appeared in Holland. Such methods of measurement involve difficulties due to the varying conductivity of the water itself. Where the solids have an electrical conductivity of the same order as the water the calibration of the device will depend on the ratio of the two conductivities so that it is difficult to apply the method to the measurement of coal concentration. The fine-coal pipeline at Carling is fitted with a gamma-ray absorption type of instrument which measures the total mass within the pipe from which the mass concentration present in the pipe can be deduced directly.

DEGRADATION OF COAL

It is a simple matter to measure the difference in head over 10 or 20 ft. of vertical pipe, subtract the water friction corresponding to the speed in the pipe (which can be obtained from the nozzle flow measurement), and obtain the concentration from $c=(i-i_w)/(s-1)$, where c is concentration by true volume in the mixture delivered, i is hydraulic gradient along pipe carrying solids per ft. of water head per ft. of pipe, i_w is hydraulic gradient along pipe with water alone at same speed and s is specific gravity of solid particles referred to the density of water.

Most present-day methods of moving coal do, to a certain extent, break it up. In hydraulic transport, the sliding of the layer of coal along the bottom must do some damage both to the coal and to the pipe; in particular, at bends or bad joints the whole layer of coal suddenly turns over. The top layer of coal moves along in a hopping motion at a speed which is little smaller than that of the water, while the sliding layer underneath may be moving at only a half or a third of this speed. Impacts must take place between coal moving at different speeds and between coal and the pipe walls. These shocks not only abrade the large coal and reduce its market value but also produce very fine particles which then create an effluent problem.



Degradation of 1 in. coal in hydraulic transport at 9.1 ft. per sec.

In hydraulic-transport installations the coal would usually pass once through a pump or feeder and then travel for perhaps several miles along the pipeline. It may be expected, therefore, that the damage to the coal done in the pipeline would predominate over other damage except for very short pipe lengths. Much of the damage takes place in the pipe and feeder.

EXPERIMENTAL MEASUREMENT

To measure degradation experimentally, relative motion between coal, water, and pipe similar to that in hydraulic transport along a horizontal pipe has been achieved with a toroidal or ring pipe arranged at the periphery of a large wheel. The ring pipe is filled with water until it is about three-quarters full with a 2 lb. or 3 lb. sample of coal in it: when the ring is rotated the water and coal remain approximately stationary while the pipe wall moves along. Water is carried forward with the pipe near the walls, and since none is carried over at the top of the wheel there is a return in the centre. When this is combined with the velocity of the ring pipe, the resulting velocity of water and coal relative to the pipe is similar to that in horizontal transport. Centrifugal force does not arise as the pipe alone rotates.

This ring pipe is of 4 ft. dia. and has a 6-in. square pipe section with the front face made of Perspex so that the behaviour of the coal may be observed. Several series of tests on degradation of 1-in. coal have been made with this machine at speeds of 7.5, 9.1, and 11 ft. per sec. for periods corresponding to distances up to 70 miles.

If degradation is defined as the attrition products below ¼ in. it has been found that, very roughly, at each speed the total loss increases in about the same proportion as the square root of the distance travelled. This diminishing rate is reasonable because as the coal becomes more rounded there are fewer corners to be knocked off.

Over a range of speed from 7.5 to 11 ft. per sec. the loss rate increased approximately as the cube of the speed. Within this range of conditions and for this particular coal the degradation seems to be given approximately by:

$$\text{Total loss} \propto (\text{speed})^3 \times (\text{distance})^{\frac{1}{2}}$$

This speed relation suggests that most of the damage is not done by the dragging of the bottom layer along the pipe but by impacts between flying pieces of coal and perhaps also between flying coal and the side walls. This is another important reason for running a coal pipeline at the lowest safe speed.

DEGRADATION BY MACHINERY

It is more difficult to estimate the damage done by other hydraulic devices such as centrifugal pumps or feeders. Centrifugal pumps used in the laboratory to circulate coal-water mixtures around pipe systems are presumed to be responsible for the greater part of the degradation occurring in these tests. In two or three hours' testing with a pump head of the order of 30-50 ft. ½-in. coal may be reduced to about ¼-in. together with the production of a great quantity of fines.

During this time the coal would have made about 200 passes through the pump so that it may be guessed that the degradation for a single pass through a centrifugal pump is of the order of ¼ or ½ per cent for a pump working at this speed. At higher pump heads this would be greater, since the pump speed increases as the square root of head. If the relation between pump speed and coal degradation is also a cubic law it would seem that a similar pump generating a head of about 200 ft. might cause a degradation loss of about 4 per cent. Great differences between one pump and another may be expected.

In some instances where hard particles have been transported pneumatically, a short life of only a few days has been reported for pipe bends. In hydraulic gravel-handling plant (where the velocities are about double those required for coal transport) the pipe may last a year or more if it is rotated periodically so that the wear is distributed around its periphery. Pipe bends may last four or six months before they require patching. Centrifugal-pump impellers made of abrasion-resisting steel may need replacing in a year, even though their speeds are generally low. A rubber lining to a pump or pipeline completely eliminates wear but it is liable to be cut by large sharp flints, or pieces of metal.

The use of rubber lining is usually restricted to gravel no larger than about ¼ in. and precautions must be taken to keep out pieces of metal. Because coal is less sharp and less dense the limiting size of coal for rubber-lined pumps might be raised to about 2 in. but there is no experience on this point since the centrifugal pumps used in washeries are usually of low head, and of simple iron construction. The damage to a pipeline when transporting coal will be much less than when transporting gravel.

A rapid increase in erosion occurs with speed, usually as the cube of particle speed. The character of the wear depends on the angle of attack and with sliding or scraping the rate of wear increases almost in proportion as the particle size. It also increases with solids concentration. Naturally it also depends on the curvature of the wall and on the density and hardness and irregularity of the particles. With normal impact the phenomena are rather different, for instance, particle size is said to have little effect.

CONCLUSIONS

The outstanding characteristics of hydraulic transport systems are the large power required and the high capacity of pipes of quite modest sizes. The compactness of the conduit gives hydraulic transport great advantages for conveying solids in confined spaces or where there are obstructions making it impossible to route directly. The ease of hydraulic loading and unloading is also important.

The application of hydraulic transport to the lifting of coal from the pit to the surface is now being considered for very deep mines where the journey time of the cage and the weight of the rope limit the lifting capacity of the shaft. The advantages of hydraulic lifting, where 200 tons per hour could be handled by a 12-in. pipe, may prove to outweigh the practical difficulties involved in bringing the coal-water mixture to the very high pressures at the bottom of the pipeline. In this connection several prototype feeders which have shown promise in the laboratory are now to be tested under site conditions. Even for shallower mines hydraulic lifting should be valuable, for the output of many mines in Britain is limited by the winding capacity of the shaft. This restriction on mine output could be relieved by screening the coal (below the surface) to 3 in. and pumping the smaller sizes through a pipe installed either in the shaft or in a special borehole. Calculations indicate that the efficiency of such a lifting system need be little less than that of the ordinary winding method. Other advantages of colliery applications lie in the possibility of greatly reduced health and fire hazards due to dry coal dust.

Permanent pipelines working with reasonable prospect of safety must be carefully designed and controlled to ensure stability in operation. To a large extent this depends on the combined characteristics of the pump and the pipeline and on the method of control of water and solids feed. Automatic control by instruments measuring pressure, velocity or concentration seems desirable for large-scale installations working continuously.

It seems clear that with soft solids such as coal a reasonable life of machinery and pipes can be expected, but with hard materials like sand, abrassion is severe and fairly frequent replacement of parts may be necessary.

Processed Copper Output in Yugoslavia

The entire copper output of Yugoslavia is produced from indigenous ores won from the Bor mines, which for many years to come will provide Yugoslav industry with 30,000 to 32,000 tons of copper per annum. In 1954 output totalled 30,295 tons, of which 26,946 tons were electrolytically refined. This output, according to *Commercial Information*, will increase when the newly discovered deposits at Majdanpek are developed.

Except for the chemical industry, which uses approximately 3,500 to 4,000 tons of blister copper each year, the greatest quantities of Yugoslavia's copper is consumed in copper and copper alloy rolling mills in cable manufacturing plants. Output of rolled products of copper and copper alloys totalled 16,693 tons in 1954, while output of lead cables and insulated conductors totalled 1,134 tons and 2,894 tons respectively. These products were supplied from several factories, namely Impal, Novkabel, Elka and Mariborska Livarna, which *in toto* have a maximum output capacity of approximately 25,000 tons of rolled copper and copper alloy products.

Two new plants have recently been constructed, the copper and copper alloys rolling mills at Sevojno with an annual capacity of 24,100 tons of finished products, and the cable plant at Svetozarevo which produces a wide variety of products. These include 4,500 tons of rolled copper pieces.

The recent construction of these two latter plants is of significance, as their output will raise production to 37,700 tons of rolled products and 34,750 tons of cables.

The Yugoslav copper industry is now acquiring a strictly processing character, as the entire current domestic production can be processed in existing plants.

Until the new mines at Majdanpek are constructed there will be no marked increase in the tonnages of copper exported, although the tonnages of products exported will continue to rise.

Long-Range Programme for Minerals Research

The expanding population of the world is dependent upon the continual availability of supplies of mineral raw materials, the exploitation of which is an extractive industry. The problem thus presented is wide in its concepts, and has been reviewed by T. B. Nolan in an introduction to the Jubilee Volume of *Economic Geology*. The following article presents the salient features of this survey, and indicates that three broad fields of long range research are regarded as specially promising.

Most of the current proposals to alleviate the basic problem presented by an assumed infinite population in a world with finite non-renewable resources have been based largely on political or economic considerations and are essentially short-term in character. The apparent lack of a solution to the basic dilemma does not mean that the needs of a relatively small number of future generations cannot be met through the creation of new resource potentials.

FIELDS OF RESEARCH

Three broad fields of long-range research seem especially promising. These are, first, the research directed towards a better understanding of the origin of the deposits now being worked, together with applied research aimed at the development of tools for detecting concealed deposits. Secondly, the research directed towards a better knowledge of the distribution of elements in the earth's crust in concentrations too small to be at present workable; and applied research on new techniques by which such material could be converted into a useful resource. Thirdly, the research into the basic physical and chemical properties of the non-renewable resources, with the objective of developing synthetic or substitute materials.

CLASSES OF RESOURCES

Research along lines designed to extend supplies of resources in the grade and quality of those now being worked is likely to be considered the most attractive for immediate applicability of results. Three general classes of resources are distinguished. The first class includes such materials as coal, limestone and gravel, which occur in extensive layers close to the surface and are generally uniform in composition. Most commodities that occur in this form are found in amounts more than adequate for our needs for many years or even centuries.

A second class of commodity normally occurs as concentrations within sedimentary layers. Oil, potash and some iron ore deposits are examples. Research programmes for petroleum over the past 30 years have been directed on the one hand towards the origin of the substance and the factors that control its migration and entrapment, and on the other hand toward the development of tools by which either the concentrations or the geological features related to the concentrations can be determined beneath the earth's surface, sometimes at very considerable depths. Present tendencies suggest that future research in the fields applicable to this class of deposit will be more and more directed towards the solution of basic geological problems, which will be designed to help predict where oil accumulates, and will be carried on concurrently with applied research in petroleum engineering on improvement of secondary recovery methods.

This pattern of research may be well under way for the third class of resources those formed as a result of processes related to the emplacement of bodies of igneous rock. Compared to the deposits of the other two classes, these are small and erratically distributed. Most of the commodities involved—copper, lead, zinc, tungsten, talc—are those which give most concern. Research directed towards an understanding of the origin of these deposits and of the factors that localized them must ultimately involve an understanding of such fundamental questions as why granite masses are located where they are, and the mechanics of formation of folds and fractures in the earth's crust. Similarly, the development of tools to locate concealed deposits will be difficult, since the targets to be looked for are relatively small, and the differences to be measured in the physical properties of favourable and unfavourable rocks are minute.

PRODUCTIVE RESEARCH

There are sound grounds for believing that research of the kind envisaged will be productive. The known deposits of this character are generally restricted to geological provinces in which there has been mountain building. There is evidence to suggest that in very large areas within these provinces a roughly constant total amount of ore material has been introduced by the processes of mineralization, and that its quantitative distribution into separate mining districts has been relatively constant.

The mineral deposits of commodities now being mined probably represent only those that were found at the present surface or that occurred in the upper 200 ft. of the surface. If it is assumed that a uniform original distribution would provide each 200 ft. slice of the crust with the same amount of material down to a depth of 1,000 ft., we have a potential of something in the order of five times the present known supply. Most mining geologists are probably in agreement that future research will succeed in finding a large proportion of these hidden ore bodies, as well as extensions of the ore bodies now being exploited.

Emphasis on the second broad field of research will in general be inversely proportional to the degree of success attained in finding for each commodity new ore bodies of present-day quality. Even a hundred-thousandths of a per cent of an element, if applied to the volume of the earth's crust, amounts to a staggering amount of material. Two sorts of problems will have to be solved in an investigation of this resource potential. One concerns exploration for deposits of lower grade, or even trace concentrations of particular commodities, the other the development of practical methods of beneficiation.

EXPLORATORY RESEARCH

Research that will contribute to exploration may well take two related paths. One will be a systematic collection of analytical data to show the distribution of one or more elements or commodities in various types of geologic environments. The other will be to determine the principles that control the distribution of the elements in nature and the factors that cause their relative concentration in one environment and relative absence in another.

The history of the mining industry provides good grounds for believing that applied research on new methods of recovery of trace amounts of material will be successful if the need is apparent. It is likely that newer methods of recovery will be based to a large extent on the necessity of reducing labour costs by increased mechanization in order to mine profitably large tonnage, low-grade deposits.

COLUMBITE—V.

Assay for Mixed Concentrate of Columbite and Tantalite

By J. P. R. POLKINGHORNE, A.M.I.M.M.

The following paper, the fifth in a series describing the occurrence and treatment of columbite, is associated with those by K. F. G. Hosking, M.Sc., Ph.D., A.M.I.M.M., and F. B. Michell, B.Sc., A.C.S.M., M.I.M.M., which appeared in our issues of March 18 and 25 and April 1, 1955. The papers were presented to the Cornish Institute of Mining Engineers at the Camborne School of Mines on January 19, 1955.

The following assay on very high grade material will be in the region of one per cent to 1.5 per cent low. The sequence of operation is:

(a) Weigh 0.5 to 1 g. of the sample which has been ground to a very fine powder.
(b) Place the sample in a silica crucible which contains approximately 2 g. of potassium bisulphate previously heated to expel H_2O and allowed to cool.
(c) Fuse the sample until a yellow melt is obtained.
(d) Cool and place in a beaker with 50 ml. of 10 per cent tartaric acid solution and warm so as to leach out the solid, then dilute with hot water and filter. Filter paper for Sn.
(e) Boil the filtrate and add 20 to 30 ml. HCl and boil again. The mixed oxides are now precipitated. Continue boiling for three to four minutes so as to coagulate the precipitate, then filter through a No. 30 or No. 40 Whatman paper and wash well with slightly acid wash water (2 ml. of HCl in 500-600 ml. hot water). At this stage the assay can be used as a quantitative and/or qualitative assay. If any doubt exists that a little titanium may be included, continue as follows :
(f) Dry, ignite and weigh as mixed oxides, and then prepare another 2 g. of potassium bisulphate and carefully add the mixed oxides to it. Fuse as before.
(g) Place the fused mass in a 400 ml. beaker and add 50 ml. of two per cent tannic acid in five per cent H_2SO_4 solution and leach out when the red/orange tannin complex will be noted. Filter, dry, ignite and weigh the mixed oxides Cb_2O_5/Ta_2O_5.

It is worthy of note that a much more accurate assay exists which is much longer and rather difficult. This assay is based on the Scholler and Powell method.

FACETS OF OPERATION

Precipitation of the mixed oxides with HCl (see note E) is not always instantaneous and at times requires from ½ to over one hour of boiling to produce the precipitate, whereas other samples (even if from the same area) produce a precipitate at once on addition of HCl. If tannin plus H_2SO_4 precipatate is reddish to brick/red, then the assay is mainly columbite. If it is dark yellow to mustard colour, then the assay is mainly in the tantalite series. This is not very easily seen, and, in fact, tantalite has to be between 50 per cent and 60 per cent to show a marked change.

Assay of high grade concentrate containing zircon and monozite may, in some cases, prove difficult, in that on leaching out the fused cake with tartaric acid a white gelatinous substance is noted, and on filtering this will be retained on the filter paper. This may be zirconium oxychloride or a silicate; it does tie up some of the columbite and tantalite, and in a combined assay of 65 per cent it may be found that up to 10 per cent of the mixed oxides are retained in this gelatinous material. Research into this gelatinous material is being carried out by the author.

The filter paper should be dried and ashed and the material retreated with bisulphate, leached again with tartaric, and filtered if necessary. The solution is then boiled and HCl added, when a precipitate of the mixed oxides will be seen. This precipitate is dried, ignited and weighed, the result added to the main assay.

APPLICATION OF HEAT

It may be found that a great deal of this trouble may be obviated by carrying out the initial fusion with a very gentle heat, namely just enough to keep the bisulphate in liquid state, for up to two hours, then increasing in the heat and working quickly up to maximum of burner. In sequence, cool to room temperature, add four to six drops H_2SO_4, and heat up again gently until the whole is liquid. Then increase heat to maximum and keep liquid swirling for whole of time. This type of attack gives the best results although it may have to be repeated.

If the amount of tin present is required (which is generally so in the case of Nigerian concentrates) it will be seen in the beaker after the melt has been dissolved in the tartaric acid and solution diluted. It will appear as a dark brown residue and will be caught in the filter paper (see note D). This paper is dried, ashed and determination for tin carried out by one of the well-known methods such as Beringer Tin Assay. Some tin may go into solution during the bisulphate fusion and can be recovered by gassing with H_2S, filtering off, dry, ignite and add to the main assay. Columbite interferes in the Pearce method of assaying tin, but does not do so in the Beringer method.

Potentials of Iceland Perlite

Several perlite deposits in Iceland appear to offer commercial possibilities, according to a report published in *Mineral Trade Notes* Vol. 39, No. 4. Indeed, Icelandic perlite producers are considering an offer from a source in the United States for the supply of approximately 9,000 tons of crude perlite a year.

One deposit of expandable perlite is situated on the east coast, north of Seydisfjordur. It is apparently a dyke with an exposed surface some 3 km. in length and 50 m. in width, tapering more narrowly at the extreme ends. Owing to the fact that no drilling exploration has so far been completed the value of the deposit is as yet unknown. A 40 m. water drop near the deposit is available for the supply of water power.

A very large deposit of expandable perlite was discovered recently in Prestahuikur at the south-western extremity of Long Glacier. This deposit has been surface mapped by the State mineralogist who regards it as an exceptionally large deposit. The Prestahuikur deposit is conservatively estimated to contain from between 25,000,000 to 50,000,000 tons. As in the case of the Seydisfjordur deposit, examination by drilling is necessary before the volume and quality of the material can be accurately assessed.

The Brake to Iron and Steel Production

The lack of increased capacity for production operations has halte the rising trend of iron and steel output in the United Kingdom. The following article, by our Iron and Steel Correspondent, emphasizes the world-wide shortage of steel, and describes the situation in both the United States and Europe in relation to that existing in the United Kingdom.

The rising trend of iron and steel production has been halted; not because of any slackening in demand, but simply because further expansion has become a physical impossibility until additional capacity is available for operations. Last month Mr. Richard F. Summers made a public admission that his company, John Summers and Sons Ltd., was unable to fully satisfy the requirements of their customers, and all the big British intergrated steel plants are similarly placed. Salesmen's difficulties are confined solely to the equitable distribution of outputs amongst a clamourous crowd of consumers who are always asking for more and the squeeze for supplies is tighter than ever.

On this point the stock statistics are illuminating. In a period of six months producers resources of steel have been reduced by 300,000 tons and pig iron stocks by 280,000 tons. Ingot production in the final quarter of the year has reached an annual rate of 20,295,000 tons compared with 18,777,000 tons in 1954 and imports are increasing at a rapid rate. Centrally purchased imports of ingots and semi-finished steel are expected to increase from 120,000 ingot tons in 1954 to 600,000 tons in 1955, and finished steel imports may reach an aggregate of 800,000 tons over the year.

The steel boom, however, is not confined to this country. British steel are likely to be nearly 10 per cent greater in 1955 than in 1954 and supplies to home users should increase from 16,500,000 to over 18,000,000 tons. This increase would be greater than in any other post-war year and well over twice as great as the average annual increase in deliveries since the war.

The steel boom however is not confined to this country. Overseas demand for British steel in hungry world markets has been whetted by relatively low prices. British steel is vastly cheaper than either European or American products, and it is not surprising that exports in the first two months of this year were 50 per cent up on the corresponding period of last year.

SIGNS OF LABOUR UNREST

The one cloud on the steel industry's horizon is the hint of labour unrest. Possibly, even probably, peace will be preserved. No other major industry in the U.K. has a record comparable with that of the iron and steel industry in the avoidance of strikes and the pacific negotiations of wage disputes. But a series of delegate meetings have discharged a militant mood amongst the blast furnance men and coke oven workers as a result of the refusal of the Iron and Steel Trades Employees' Association to concede double pay for week-end work. There are still confident hopes that a settlement will be reached without a stoppage which would be disastrous in its consequences.

On a much larger scale the first symptoms of unrest are becoming manifest in the United States. The Automobile Workers' Union has launched an agitation for a guaranteed annual wage and a similar claim figures in the programme of the steel workers, whose contracts are due to come up for review on June 1st.

During the first quarter of this year the recovery of American steel has been quite remarkable. Weekly outputs were raised during that period from a low point of 81.2 per cent in the first week in January to 94.2 per cent in mid-March and it is expected that ingot output in the second quarter will run further ahead. Thus from the workers' standpoint the atmosphere is favourable and one local union in the heart of the Pittsburgh area is advocating a drive for a 32 hour week with 40 hours pay. Informed opinion is that an all-round advance of 8 to 10 c. an hour may form the basis of a settlement which would involve a further advance in steel prices.

Obviously this inflationary trend must ultimately be halted either by internal or external pressures, but these considerations can have little affect so long as famine conditions prevail. Informal rationing of iron and steel supplies is now the common practice in the U.S. and the U.K. alike and various producers admit that under extreme pressure they have fallen weeks and in some cases months behind with their deliveries. The accumulation of orders has become a positive embarrassment. Bookings for the current quarter have almost ceased and a large proportion of the potential outputs of various products in the third quarter have already been bespoken.

SUPPLIES FROM OVERSEAS

To what extent European producers can come to the aid of British consumers, hard pressed for supplies of semi-finished and finished steel products, is a matter for conjecture. Imports have increased and it is interesting to observe that by far the biggest tonnages received have been consigned from American sources. But much bigger quantities of pig iron, steel semis and finished products are needed to balance supply and demand, until more plant can be brought into operation.

The British Iron and Steel Federation's March Bulletin discloses that there are now only 99 blast furnaces at work —six fewer than there were a year ago. Several old furnaces of small capacity have, however, been replaced by new and bigger units, and a general advance in technique has enabled blast furnacemen to achieve a not unsubstantial increase in pig iron production.

Other new furnaces are approaching completion and in anticipation of that event satisfactory arrangements have been made to step up the imports of foreign ore during the second half of the year. Most of these imports will come from traditional sources, but the clearance of ore cargoes from the Great Lakes has now begun.

The output of ore from the Quebec Labrador area is increasing rapidly and whilst the bulk of this material is directed to American blast furnace plants it is of interest to note that a record cargo of 20,000 tons is expected in the Tyne and a purchase of 50,000 tons of ore from Canada has been arranged by the Royal Netherlands blast furnaces.

Latest evidence of the boom in European steel comes from Paris where it is reported that steel production in France last month reached an all-time record of 1,134,000 tons.

It is also announced that plans are now completed for the installation of a new steel plant near the Atlantic port of Santos in Brazil. The initial capacity of the plant will be 300,000 tons of finished steel products rising ultimately to 1,000,000 tons. The plant will be operated on imported coal, and the Itabira mines will supply ore with an average content of 65 per cent Fe.

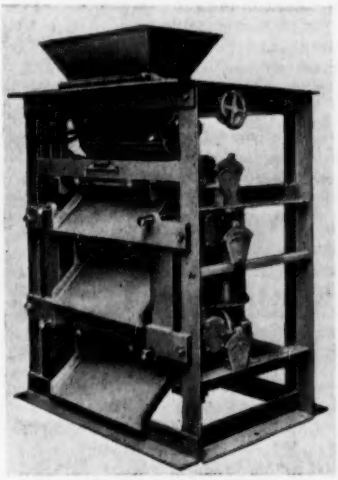
THE BRITISH INDUSTRIES FAIR, 1955

The British Industries Fair, 1954, was the last to be held under the management of the Board of Trade. This year—and in subsequent years—the management will be in the hands of British Industries Fair Ltd., a company formed last year to promote the Fair as a commercial undertaking.

This year the Fair will be held from May 2 to May 13 at Olympia and Castle Bromwich, Birmingham.

The following notes present a preview of those products relating to the mining industry which will be displayed at Castle Bromwich by the various manufacturers at the Fair.

On Stand C421 *Rapid Magnetic Machines Ltd.* will again be exhibiting a representative cross section of their permanent and electro-magnetic equipment. These units have an end use in many industries.



The Rapid Induced Roll Separator

An addition to the manufacturers' range of swarf separators will be exhibited, also the multi-separator for treating the more complex swarf and scrap. An electro - magnetic ore separator, Type O.G., will also be on view.

A new exhibit, on this occasion an addition to the company's range of mineral separators, will be the Induced Roll, which is designed for the purification and concentration of dry, granular, free flowing, feebly magnetic material such as silica sand, abrasives, and the like. Units in the company's range of permanent equipment will also be available for inspection. The new self-cleaning Ejecta plate magnet will also be exhibited, as will electro and non-electric self cleaning drum and pulley type separators

Electro-magnetic chute type separators will be shown as will the manufacturers' Type V separator which is a vibratory machine designed to treat fine powders and other commodities of a similar consistency that require mechanical motion to precipitate their flow.

On Stands C413 and 312 *G. R. Turner Ltd.* will exhibit a 350 tons per hour underground conveyor/elevator capable of negotiating bends in both the horizontal and vertical planes. This new conveyor belt may revolutionize the transport of coal from the face to the surface.

The great value of this equipment lies in its flexibility. Any gauge can be built and any length of track installed. Once the coal is on the belt it cannot be taken off until it reaches the surface. At present, it is believed, this conveyor belt is the only one of its kind in the world, and it is likely that other industries besides coal-mining will be interested in the idea.

The display of *Hilger and Watts Ltd.* will be on Stand D310. The Hilger Division is to exhibit optical apparatus for gauging and inspection, together with projectors for profiles and surfaces. Angle dekkors, slip gauges, measuring machines, clinometers, block levels, autocollimators, line standards and precision scales will be included in this exhibit.

The Watts Division will display projectors for the rapid and accurate checking of formed components, taps, hobs and profiles of all kinds, as well as types for all departments, microptic measuring machines for gauge measurement, and angle dekkors.

Fire hose, metallic and non-metallic gears, gear units, oil seals and similar equipments will be displayed on Stand D711 by *George Angus and Co. Ltd.* Belting in leather, cotton and rubber will also be displayed.

These manufacturers invented and developed reinforced rubber-lined hose, which is claimed as the lightest woven hose of its type for fire-fighting purposes. The hose can be treated to withstand mildew and has two to three times the wear resistance of conventional unlined hose. The Gaco metal insert oil seal has been scientifically designed to seal rotating shafts against leakage of oils, greases and many other fluids. Also on display will be dry powder fire extinguishers, which put out petrol fires in a few seconds.

Axial, propellor and centrifugal fans will be shown by *Keith Blackman Ltd.* on Stands D641 and 540. Other units manufactured by the firm also to be displayed will include dust exhausting and collecting equipment as well as fume, smoke and steam removal fans.

A particular point of interest is that the pivot roller-mounted axial fan for improved marine ventilation, first shown at the 1954 B.I.F., has now had adjustable downstream guide vanes incorporated and as a result has higher efficiency and pressures, lower sound levels and lower speeds for the same duties. Some of the uses for which air moving and treatment equipment is in demand is in foundries, collieries, chemical factories, food works and the marine industry.

Holman Bros. Ltd. are occupying Stands No. 1203 and 1102, in the Outdoor Section, and are again exhibiting a representative range of their products concerned with compressed air. Many of the machines are arranged to operate. Two stationary compressors will be shown, the smallest air-cooled model of the Holman range, the ATH8S, direct coupled to an electric motor, the whole being mounted with a receiver on a steel bedframe to form a neat self-contained unit; and the T36R with integral water-cooling system which dispenses with the need of external water supply, driven by v-belts from an electric motor.

In addition, two sizes of portable compressors will be shown —the modernized T25D and the TA13D. Of interest to practically every industry is the forging hammer, capable of carrying out a variety of jobs. The installation of a Holman D.G. hammer has enabled only one smith to cope with work previously requiring two smiths and two strikers.

The pneumatic tools include machines for all purposes. The latest developments in the suppression of dangerous dust will be demonstrated with dustuctor grinders. A recently marketed pneumatic pick will be shown in two forms, namely the PW2 Wet and PWD2 Dry. The medium weight SS32 road ripper is shown at the B.I.F. for the first time, as is the 3000 series rotodrill with a drilling capacity in steel of ¾ in. or ½ in. (according to gearing).

The Holman PWD2 pneumatic pick

In a display of rock drills will be seen machines ranging

from the lightest Handril (Silver Eight) to the heaviest Drifter (SL16A). Between the two extremes is the fast drilling Silver Three. The Dryductor drill, with which dust-free dry drilling is done, is shown on two different mountings—an airleg and a double telescopic stoperleg. The short Dryductor drill, which achieves equal performance with greater compactness, has been introduced since the last Fair.

This will be the fifth year that *F. E. Weatherill Ltd.* will have exhibited at the B.I.F. The first occasion marked the company's entry into the mobile loading shovel industry and only one model was exhibited, namely the 2H Weatherill hydraulic loading shovel.

At this year's Fair six different types of Weatherill loading shovels will be exhibited on Outdoor Stands Nos. 1108 and 1209. These together with the 2H model will include the 2HH "Hi-Tip" machine combining the advantages of the 2H with the ability to load into hoppers or receptacles 13 ft. 6in. high, and the new 3 cu. yd. capacity 6HL Weatherill hydraulic coke loader with which is offered a readily interchangeable scoop of 1½ cu. yd. to enable the machine to be used for heavier materials as well.

Another new machine also to be exhibited for the first time is the 4HTW, a hydraulically operated Overloader combining forward or rear scoop discharge. Scoop crowding action is incorporated and discharge control of the scoop is also an important feature of the design.

The following Divisions and subsidiary companies of *Imperial Chemical Industries Ltd.* will exhibit at the B.I.F.: Metals Division on Stands D409, 308, 315 and 272; Plastics Division on Stand D619; Nobel Division on Stand 220 and Marston Excelsior Ltd. on Stands D427 and 326.

The Plastics Division will show the extensive range of compression and injection moulding materials which the Division manufactures. Of particular interest on the Metal Division's stand is the display of wrought titanium products, with emphasis on applications in the aircraft industry. I.C.I.'s new plant in the North of England for the manufacture of 1,500 tons of raw titanium a year will be in full operation by early autumn.

There will also be a wide-ranging display of wrought non-ferrous metal products—copper, brass and aluminium sheet, strip, rod, tube, wire and plate—supplemented by exhibits showing their specific application in various industries, such as petroleum refining, building and transport. Of considerable interest to the chemical and oil refining industries will be the display on Marston Excelsior Ltd.'s stand of aluminium alloy pipework, bends and tees. The Nobel Division is showing silicone oils, resins, rubbers and miscellaneous products for mould release, foam suppression, water-proofing masonry and textiles, heat-resistant paints, electrical insulation, mouldings, extrusions, and for coating glass and asbestos cloth.

Cuxson, Gerrard and Co. Ltd., specialists in industrial first aid, will equip Stand B516 as a typical works First Aid room. The products of these manufacturers range from aspirin tablets to store cabinets, and include such items as bandages, plasters, germicides, stretchers, ligatures, first aid outfits and the like. The most up-to-date First Aid treatments and methods will be on display.

On Stand C500 exhibits of *The English Electric Co. Ltd.* will comprise a Superfarm fuse switchboard, Superfarm flush mounting and surface mounting distribution fuseboards and isolators, overhead busbar equipment and fittings, H.R.C. cartridge fuse links and substation equipment, a selection of motors, including F.H.P. designs, and displays of meters, instruments and relays.

The "English Electric" motors on view include designs conforming to British Standard dimensions and designs to American N.E.M.A. standards. The company claims to be the first producer in the world to deliver from stock, and in bulk, the whole of a new range of ventilated motors to American N.E.M.A. 1954 dimensions. These machines are intended to supplement their already well-known range of "LY" British Standard dimensioned motors of the T.E.F.C. type.

On Stands D417 and D316 *John Bedford and Sons Ltd.* will exhibit black, ground steel bars, hollow drill steel, detachable and T.C. drill bits as well as engineering precision files and general tools.

Shell moulds made with Cellobond resins, demonstrating the strength and excellent surface they impart, will form the exhibit of *British Resin Products Ltd.* on Stand D429. Sand cores made with Cellobond resins and moulded articles of Cellobond polyester reinforced with glass fibre will be included in the display.

The display of *The General Electric Co. Ltd.* on Stands 503 and 402 will depart from the company's normal practice at the B.I.F. of emphasizing a particular facet of electrical progress. This year it portrays instead a representative cross section of the company's activities, which cover every field of electrical endeavour. The principal sections of the stand will be devoted to power generation and its industrial utilization, electronics and communications, lighting and domestic equipment. The story is told by models, photographs and examples of products, while an unusual central feature will consist of a display of G.E.C. publications dealing with every aspect of electrical and electronic development.

There are two models on this part of the stand. One is a ¼ in. scale model of a 120 MW three-cylinder reheat cycle turbo-alternator. The other is an example of modern practice in 1,500 volt D.C. motor coach stock.

The G.E.C. is engaged, on behalf of the Ministry of Supply, on the development of guidance systems for guided weapons, and two pieces of equipment developed for the provision of guidance in missiles will be displayed on the electronics and communications section of the stand. This section of the stand will also display G.E.C. transistors, magnetrons, valves, subminiature valves, photocells, Geiger tubes and other electronic components.

The products of *Dunlop Rubber Co. Ltd.* will be displayed on three stands. On Stand D522 the General Rubber Goods Division will exhibit industrial rubber products such as mechanical rubbers, rubber covered rollers, hoses, anti-corrosion and abrasion-resisting linings, ebonites, P.V.C. fabrications and similar equipments.

On Stands D623 and 522 the Aviation Division will show flexible pipes for high, medium and low pressure hydraulic or pneumatic services, while on the same stands the Engineering Components Division will display a range of precision rubber components for engineering and industrial applications. These latter aspects will include such equipments as load measuring capsules, inflatable seals, anti-vibration mountings and flexible transmission couplings.

On Stand D701, *Mastabar Belt Fastener Co. Ltd.* will display certain equipments of interest to the mining industry. These will include the Comet colliery conveyor belt lacing system. Other units will include all-steel power and hand-operated lacers in a full range of sizes. Comet accronized fasteners will also be displayed, as will the combined belt cutter and squarer and flexible steel pins.

On Stand C605 *Electromagnets Ltd.* will display a wide range of exhibits including several interesting new developments. The patent "Select-O-Load" control system will be exhibited in conjunction with a rectangular lifting magnet selecting thin steel plates individually. This has never been satisfactorily accomplished with normal heavy duty lifting magnets prior to the introduction of this revolutionary new system.

Another interesting exhibit will be the Boxmag high intensity electrically energized road and runway type magnetic sweeper complete with self-contained petrol electric generating set. Numbers of these machines are in use in various parts of the world for clearing roads and runways of dangerous ferrous material which causes considerable damage to pneumatic tyres. Interest will also be caused by the exhibition of a conveyor with both magnetic separation and also electronic metal detection.

METALS, MINERALS AND ALLOYS

COPPER.—Copper has remained in extremely tight supply in the United States, though dealers have suggested that demand is not quite so urgent as in the recent past. If any slackening has taken place, it could only have been slight however. March consumption by American fabricators reached the record level of 142,776 tons, an increase of 74,000 tons on February. This is not, in fact, regarded as a true reflection of the current state of demand since, in part, it represents a rush to take delivery before copper rose to the 36 c. level, a rise which mill customers clearly foresaw.

Even so, bookings in the month would account for 143,855 tons and unfilled orders reached 181,977 tons, an increase of 1,100 tons. Fabricators' stocks dropped 12,200 tons to 311,235 tons and since working stocks account for 301,937 tons, visible supply was only 1,390 tons. The demand for scrap has been sharp and offerings from custom's smelters at 40 c. for May have been snapped up. The U.S. Bureau of Foreign Commerce has extended the second quarter copper export restrictions to cover refined copper produced from scrap of Canadian origin. It appears that this move is dictated partly by a desire to conserve supplies and partly to end a sort of black market in swapping "American" copper and "foreign" copper with the latter at a substantial premium. No appreciable change in the situation is expected till the late summer when more new production becomes available and when the vacation period brings its own slackness.

The only possible and immediate change would be for the worse. On May 1 twenty-one union locals begin bargaining for a new contract with Kennecott Copper to replace the one expiring on June 30. The unions are seeking an increase of 20 c. an hour and a $60 insurance programme covering layoffs, sickness, or accident. Kennecott is only the first, for contracts expire virtually throughout the mining and processing industry this summer.

The workers seem certain to get a substantial rise. First, because of the 6 c. rise in the domestic price of copper; secondly, because of the present American boom, all other workers are demanding substantially higher wages (last year in the recession demands were generally moderate) and the copper industry cannot stand aside from the general movement. What matters is whether the new contracts can be reached without strikes; and to what extent high cost structures will be built into the present price level thereby rendering American copper relatively less competitive in easier supply conditions.

An indication of what may be in store comes from Chile where the workers of Potrerillos have won a 70 per cent increase in wages retrospective to January 1 and have, therefore, called off their strike. There seems little doubt that Chile is pickling another fine inflationary rod for herself by tolerating wage increases of this magnitude. However, the new exchange rate for export earnings of copper and concentrates (which does not affect the American companies) appears designed to prevent excessive dollar imports as the result of the present prosperity.

1955 export revenue from copper is now expected to reach $179,000,000 against $121,000,000 forecast in the budget; this is a rise of $58,000,000 and the government hopes to retain this sum to amortize foreign debt. These figures may well be optimistic especially as a recent statement by the Minister of Mines that copper was sold last week at 46 c. is universally disbelieved.

From Rhodesia, too, there is news of wage claims. The African Mine Workers' Union has resumed its claim for 10s. 8d. per shift (6s. 8d. in daily pay, 1s. 6d. cost of living allowance, and 2s. 6d. copper bonus). The Chamber of Mines has asked that discussions on relations with the African Staff Association should precede wage talks. It will be remembered that when the claim was first presented it was rejected although the Chamber offered to submit it to arbitration.

I.C.I. is reported to have agreed to buy 3,000 tons of blister from Turkey, the metal to be delivered in the second half of the year at a price related to the L.M.E. average over an agreed period. It will be recalled that copper was one of the specified "untraditional commodities", half of the earnings from which were to be devoted by Turkey to its use on the Turkish debts under the Anglo-Turkish debts agreement.

LEAD.—Although sale of lead in the week ending April 20 reached nearly 16,000 tons (an increase of 50 per cent inside a fortnight from a level that was already considered good) and registered the best sale for well over a year, demand has since slightly weakened. The heavy buying was attributed to a conviction that the price would advance from 15 c. per lb. New York and this conviction is not now so widely held.

Still another reason why the hectic buying fell away was the belief that Washington cannot much longer hide its hand on the future of stockpiling, while a decision is also expected on the Administration's foreign trade bill now before the Senate. Meanwhile it is reported from Canada that American demand for lead is such that a higher import duty on the metal is not considered a practical possibility.

TIN.—Tin has been a steady market in New York with little movement pricewise and dealings quiet. Against a background of continuing strong demand for tinplate on both domestic and export account, the market has had to contend with an unusual amount of uncertainties, the Texas smelter's future, the Bandung Conference and, on the one hand, forecasts that the Chinese Communists would soon attack Formosa and, on the other, signs that Peking and Washington could conceivably negotiate together. The uncertainty should not persist, however, for developments on both matters are speeding up.

Two flatly contradictory resolutions are now before the House of Representatives. The first is the resolution passed unanimously by the Senate as recommended by the Joint Armed Services and Banking Committees to keep the tin smelter operating until June 30, 1956, "also as long thereafter as may be hereafter authorized by the Congress."

The report of the two committees to the Senate, recommending passage of the concurrent resolution on the Texas smelter, made no direct reference to tin buying policy except to say that views of the Government Departments were sought as well as the views of the Bolivian Government as expressed by its Ambassadors. It pointed out that the United States was entirely dependent on imports for its tin needs, and buying for the national stockpile of strategic metals and minerals.

The report declared: "As recently as March 21, 1955, the stockpile goals for tin, both long term and minimum were revised. The revision was upward, and, as of March 23, the Office of Defense Mobilization's figures showed that the Government had on hand, or on order, a quantity of tin in excess of the minimum objective but several thousand tons below the long-term objective.

"Thus, even to complete the long-term stockpile goal, it is necessary for the smelter to continue operations beyond June 30, 1955, or purchases of refined tin will have to be made on the commercial market.

"Moreover, it should be noted that the tin stockpile objectives have been revised seven times since the first goal was set on November 20, 1944. The number of these changes must be borne in mind in determining whether the stockpile at any given time represents the kind of tin security this nation and the free world require."

The new resolution recommends the establishment of a permanent tin smelter in the United States and asks the President to appoint a Commission to study how to do it. A resolution of this kind is understood not to have the force of law but to be an expression of Congress opinion which the President may find it difficult to ignore. There is no doubt, however, that the Administration has strenuously opposed keeping the smelter operating and it is widely believed that the evidence given to the Senate Committee, which has never been published, was of the same point of view.

The Bolivian Foreign Minister has welcomed the resolution which he said would benefit Bolivia because "it will assure the sale of 50 per cent of Bolivia's tin to the U.S. and the tin will go into the stockpile not on the world market". This is an excellent example of the pernicious effect of stockpiling for it has clearly led the Bolivian Foreign Minister to lose all touch with reality.

Meanwhile, Representative Gamble (R-New York) has introduced a resolution to authorize the disposal of the tin smelter. Mr. Gamble's Bill stated that adequate tin stockpiles have been accumulated for defence and tin was available in ample supply. The Bill would accordingly authorize and direct the Government "to take steps immediately to terminate operation of the Government-owned tin smelter at Texas City, Texas, as soon as practicable.

"In no event shall such smelter be operated beyond the period of time needed to complete processing of materials to which the Government has taken title prior to July 1, 1955."

ZINC.—If possible, demand for Special High Grade zinc in the United States has grown even stronger, and is currently well in excess of any foreseeable supply. It will presumably remain so while automobile output continues at its present rate, but not even the most optimistic believe this can be maintained past the summer—even barring strikes. Demand for prime Western

is still spotty and has not recovered the keenness it lost when the price advanced to 12 c. East St. Louis, but there is little doubt that the new price is firmly established. Meanwhile the struggle goes on in Washington to maintain assistance to the industry.

It is now commonly believed that stockpiling will continue past June 30 and that the targets of 200,000 tons of lead and 300,000 tons of zinc will become definite and not permissive. If this is so, the targets can be reached only by voting an indeterminate sum of money or by revealing the maximum prices that G.S.A. will be prepared to pay. The Administration's promised announcement on the matter is awaited with interest. Clearly the President's full trade liberalization programme is badly bogged down. The Foreign Trade Bill, now before the Senate, although passed by the Senate Finance Committee is still not safe with the lead and zinc mining industry in full cry for higher import duties.

In this delicate situation the President has had to ask for Congressional approval for the Organization for Trade Co-operation. He has, however, already let slip a third of the 90 days in which he must make up his mind on the Tariff Commission recommendation for a higher import duty on bicycles, and has not dared produce the promised customs Simplification Bill. Congress and President each waits for the other and, while they wait, a decision on stockpiling will presumably wait too.

NICKEL.—Speaking at the annual meeting of International Nickel at Toronto this week (of which a report appears on page 481) the chairman, Dr. John F. Thompson, told shareholders that Government stockpiling together with defence requirements absorbed about 40 per cent of total free world production last year. Nevertheless, as he has already indicated in earlier statements this year, he expressed the view that, with production running at the record level of about 195,000 s.tons a year and a slackening in the defence requirements, the supply of nickel for civilian uses should improve even if all requirements could not be met. Looking further ahead, Dr. Thompson foresaw a free world production running at some 225,000 tons a year by 1958.

Dr. Thompson had this to say on the effects of stockpiling on civilian use: "While stockpiling is expected to continue, there are indications that the scheduled intake for this purpose may be modified and that after defence requirements have been satisfied, more nickel will be available this year for civilian applications than in 1954.

"This is an encouraging development. The company's management feels to-day, as it always has, that adequate defence preparedness is impossible without a healthy nickel-consuming civilian industry. To-day, however, Government stockpiling and defence requirements have, of necessity, weakened part of this important market by restricting the amounts of nickel available for civilian purposes. Many manufacturers, in the fear that relief would be long delayed, have been endeavouring to eliminate nickel in new design plans for their products. If this situation continues it can only have consequences detrimental to the security of the free world."

TUNGSTEN.—Persistent demand for wolfram ore on a market already tight for supplies has pushed up the price of tungsten ore in London to 240s.-245s. per l.ton unit c.i.f. Europe. The reaction in New York has been much the same and foreign tungsten ore is currently quoted there at $30-$31 per s.ton unit.

The present position would appear to be that supplies of tungsten ore are not plentiful at present prices. Effective demand on United Kingdom account and from the Continent, particularly West Germany, has been firm and with U.S. buying interests reported supplies will remain tight.

It will be recalled that this column on January 21 anticipated a price squeeze should there be overt signs of American buying interest. If demand from this source does develop on any appreciable scale prices will continue their upward course.

The London Metal Market

(From Our Metal Exchange Correspondent)

Once again market interest has been centred upon copper which is still fluctuating too violently for the liking of members, so much so that the Committee issued a statement on behalf of its members once more drawing attention to the fact that the market's function was to reflect events, and that it was the events themselves which had caused the violent fluctuations and not the activities of members of the Exchange.

On Tuesday there was again a rumour in some sections of the trade that a further release of copper was contemplated by the Government but this was officially denied. As the rumour was unknown to a large section of the market the fall in price was probably due more to complete lack of demand everywhere.

It is understood that the Board of Trade is still discussing ways and means of selling the 28,000 tons still to be disposed of out of the first release. Although there are some days when buyers are almost completely absent from the market the overall consumption remains extremely high, and any further interruptions in the flow of supplies will undoubtedly have an immediate effect on the price; it is therefore hoped that the new claim recently submitted to the Chamber of Mines by the Northern Rhodesian African Mineworkers' Union will not lead to renewed labour unrest.

The only talking point in the tin market concerns the future of the Texas smelter, and at the time of writing the situation appears somewhat confused, although tending towards a further year's operations at the end of which the smelter would either be sold to private enterprise or closed down. On Thursday morning the Eastern price was equivalent to £730¼ per ton c.i.f. Europe.

The lead and zinc markets remain uninteresting with prices steady and with outside demand running at the recent good levels.

Closing prices and turnovers are given in the following table:

	April 21		April 28	
	Buyers	*Sellers*	*Buyers*	*Sellers*
Copper				
Cash	£321¼	£322¼	£313½	£314
Three months	£310	£311	£301	£302
Settlement	£322¼		£314	
Week's turnover	8,575 tons		5,950 tons	
Tin				
Cash	£717½	£719	£715	£715½
Three months	£718½	£719	£715	£716
Settlement	£719		£715½	
Week's turnover	625 tons		1,100 tons	
Lead				
Current half month	£104¼	£104⅜	£103⅛	£103⅜
Three months	£104¼	£104½	£103⅛	£103⅜
Week's turnover	4,725 tons		3,500 tons	
Zinc				
Current half month	£89	£89¼	£88	£88⅛
Three months	£87⅛	£88	£87	£87⅛
Week's turnover	4,250 tons		3,925 tons	

OTHER LONDON PRICES — APRIL 28

METALS

Aluminium, 99.5%, £163 per ton
Antimony—
English (99%) delivered, 10 cwt. and over £210 per ton
Crude (70%) £200 per ton
Ore (60% basis) 22s./24s. nom. per unit, c.i.f.
Bismuth
(min. 2 cwt. lots) 16s. lb.
Cadmium (Empire) nominal
Chromium, 6s. 5d./7s. lb.
Cobalt, 21s. lb.
Gold, 250s. 4½d.
Iridium, £30/£32 oz. nom.
Manganese Metal (96%-98%) £255/£265 according to quantity
Magnesium, 2s. 4d. lb.
Nickel, 99.5% (home trade) £519 per ton
Osmium, £30 oz. nom.
Osmiridium, £40 oz. nom.
Palladium, £6 5s./£6 15s. oz.
Platinum, £27/£27 15s.
Rhodium, £41
Ruthenium, £16 oz.
Quicksilver, £108 10s./£109 ex-warehouse
Selenium, 43s. nom. per lb.
Silver, 75½d. f.oz. spot and 75½d. f'd
Tellurium, 15s./16s. lb.

ORES, ALLOYS, ETC.

Bismuth	65% 8s. 6d. lb. c.i.f. 60% 8s. 3d. lb. c.i.f.
Chrome Ore—	
Rhodesian Metallurgical (semi-friable) 48%	£13 per ton c.i.f.
,, Refractory 45%	£13 per ton c.i.f.
,, Smalls 42%	£10 2s. 6d. per ton c.i.f.
Magnesite, ground calcined	£26-£27 d/d
Magnesite, Raw	£10-£11 d/d
Molybdenite (85% basis)	105s. 3d.-108s. 1d. per unit c.i.f.
Wolfram and Scheelite (65%)	240s./245s. c.i.f.
Tungsten Metal Powder (98% Min. W.)	17s. 9d. nom. per lb. (home)
Ferro-tungsten (80%-85%)	14s. 9d. nom. per lb. (home)
Carbide, 4-cwt. lots	£37 6s. 3d. d/d per ton
Ferro-manganese, home	£53 17s. 6d. per ton
Manganese Ore Indian c.i.f. Europe (46%-48%)	76d./78d. per unit
Manganese Ore (38%-40%)	64d./66d. per unit
Brass Wire	3s. 1d. per lb. basis
Brass Tubes, solid drawn	2s. 5½d. per lb. basis

THE MINING MARKETS

(By Our Stock Exchange Correspondent)

The past week has been typical of pre-election conditions in the Stock Exchange. Although there was slightly more activity, prices have been erratic and a fall at the start was offset by an improvement on Tuesday and Wednesday. The squeeze on the money market has been shown by a further downward adjustment of gilt-edged. The strength of sterling abroad acted as a steadying influence on the market.

Kaffirs were weak. The demand for 15 per cent increase in wages by the European unions and the increase in political activity at the Cape caused lack of confidence. Investors prepared to take a view on South African shares are becoming fewer and selling in London is rarely absorbed by buying in the Cape. The quarterlies did little to encourage this market.

Among finance houses, prices moved downwards. Anglo American Corporation shed 2s. 6d. and Johannesburg Consolidated reached a new low level on further consideration of their interest in Freddies Consolidated. West Rand Investment Trust and West Witwatersrand, although easier, held up fairly well. Vereeniging Estates remained steady. The chairman was optimistic that the proposed improvements in the South African railway system will free movement of coal.

Among individual Rand mines, the increasing costs of bringing new mines into production caused falls in Buffelsfontein and Hartebeestfontein. The result from Crown mines must be considered encouraging for old property but the intrusion of a dyke may well mean a gradually diminishing profit during the remaining life of the property. Dominion Reefs alone were better, on uranium prospects. Despite good results from Doornfontein, the shares followed the general movement down. The wage demand and the lower price of gold had a depressing effect on some of the older mines; Durban Deep, Robinson Deep and Daggafonteins all declined. Vogelstruisbult are now beginning to feel the effects of higher taxation, and persistent rumours of less good results caused a setback in the shares before the figures were announced.

In the Orange Free State, conditions were no more cheerful. Free State Geduld at one time fell below £4 but later recovered when bargain hunters appeared. Loraine, although announcing higher payability, fell another 6d. Harmony and St. Helena are both making good progress with their plants and despite the fact that returns from these mines are satisfactory, the share prices fell. Investors undoubtedly have their eye on the high cost of bringing an Orange Free State property into production and maybe are beginning to doubt whether returns can justify the capitalization of many mines. Even the two President properties were distinctly easier.

There was little interest in West Africans and West Australians, and both markets remained quiet. The optimistic speech by the chairman of Ashanti was made too late to have any effect on this week's share price.

In the miscellaneous gold section, interest was centred on Camp Bird. Mr. Dalgliesh at the meeting obtained sufficient votes to oust the Board despite the promise by Consolidated Gold Fields to take over the shares at 20s. each. The price dropped heavily at this news, finishing at 15s. 10½d.

Among copper shares there was a continued downward movement. This was partially accounted for by selling from the continent coupled with little buying in London. The anouncement that the Government does not intend to sell more metal to the market than has already been announced steadied the price but failed to bring in buyers for the shares. The underlying position still appears sound, as the United States is believed to be short of copper and the mines should be able to produce good results with a metal price of about £300.

Tin shares showed few changes, but a slightly harder tendency was noticeable. The publication of the annual results by Amalgamated Tin caused the shares to gain the turn.

In the miscellaneous base metal market, Central Provinces Manganese declined following the announcement of lower profits and both Turner and Newall, and Wankie suffered from the general market malaise. A new South African coal share is being introduced to London. The South Witbank coal mine has now been established some years and the company's prospectus indicates that proved reserves of steam and domestic coal should give the mine a life of some ninety years. The seams are at shallow depth.

	Price April 27	+ or — on week
FINANCE		
African & European	3/-	—1/-
Anglo American Corpn.	7½	—½
Anglo-French	20/7½	.....
Anglo Transvaal Consol.	27/6	.....
Central Mining (£1 shrs.)	43/-	—3d
Consolidated Goldfields	58/1½	—7½d
Consol. Mines Selection	37/6	—7½d
East Rand Consols.	2/4½	.....
General Mining	5-/6 XD	—1/-
H.E. Prop.	9/7½	.....
Johnnies	35/6	—2/-
Rand Mines	3½	+1/2
Rand Selection	41/10½	—7½d
Union Corporation	40/-XD	—2/3
Vereeniging Estates	4-/6	.....
Writs	41/10½	—7½d
West Wits	36/6	—6d
RAND GOLD		
Blyvoors	28/6	—3d
Brakpan	6/3	—3d
Buffelsfontein	33/3	—1/9
City Deep	12/6	.....
Consol. Main Reef	20/7½	.....
Crown	45/7½	—7½d
Daggas	55/-	—2/6
Dominion Reefs	36/6	+6d
Doornfontein	26/3	—2/-
Durban Deep	31/10½	—1/10½
E. Champs	7/9	—9d
E. Daggas	10/6	—3d
E. Geduld (4s. units)	28/-	—3d
E. Rand Props	2½	—⅛
Geduld	3½	+⅛
Govt. Areas	10/-	—3d
Grootvlei	20/3	—9d
Hartebeestfontein	29/6	—2/-
Libanon	8/-	—6d
Luipaards Vlei	22/3	—3d
Marievale	20/6	—9d
New Kleinfontein	7/6	—9d
New Pioneer	14/6	—9d
Randfontein	60/-	—3/6
Robinson Deep	16/-	—1/6
Rose Deep	14/-	.....
Simmer & Jack	4/-	—1½d
S.A. Lands	23/1½	—7½d
Springs	2/6	.....
Stilfontein	25/6	—9d
Sub Nigel	36/10½	.....
Vaal Reefs	30/6	—3d
Van Dyk	4/3	+3d
Venterspost	12/-	.....
Vlakfontein	16/6	—6d
Vogelstruisbult	30/6	—3/3
West Driefontein	5½	+⅛
RAND GOLD contd.		
W. Rand Consolidated	42/6	—7½d
Western Reefs	41/3	—1/3
O.F.S. GOLD		
Freddies	4/-	—3d
Freddies Consolidated	5/9	—3d
F.S. Geduld	4-/6	—⅛
Geoffries	15/6	—6d
Harmony	33/3	—1/-
Loraine	9/6	—6d
Lydenburg Estates	18/9	—1/3
Merriespruit	11/9	—3d
Middle Wits	16/3	.....
Ofsits	3-/6	—⅛
President Brand	67/6	—1/3
President Steyn	37/9	—2/6
St. Helena	26/9	—1/-
Virginia Ord.	14/-	—3d
Welkom	20/6	—1/3
Western Holdings	4-/6	—⅛
WEST AFRICAN GOLD		
Amalgamated Banket	2/3	—1½d
Ariston	6/-XD	.....
Ashanti	22/-	—3d
Bibiani	4/9	—1½d
Bremang	1/4½	.....
G.C. Main Reef	3/3	.....
Konongo	2/9XD	.....
Lyndhurst Deep	1/4½	.....
Marlu	10½	.....
Taquah	2/4½	—3d
Western Selection	9/-	+3d
AUSTRALIAN GOLD		
Gold Mines of Kalgoorlie	12/6	+3d
Great Boulder Prop.	9/-	—1½d
Lake View & Star	15/3XD	—3d
Mount Morgan	19/6	.....
North Kalgurli	6/6	—3d
Sons of Gwalia	4/6	.....
Western Mining	9/9	.....
MISCELLANEOUS GOLD		
Cam & Motor	8/4½	+1½d
Champion Reef	4/-	.....
Falcon Mines	7/1½	.....
Globe & Phoenix	23/6	—2/6
G.F. Rhodesian	5/10½	—1½d
Motapa	1/4½	.....
Mysore	4/9	.....
Nundydroog	5/9	—3d
Oceagum	4/7½	+4½d
St. John d'El Rey	11/10½	—7½d
Zams	50/-	—1/-
DIAMONDS & PLATINUM		
Anglo American Inv.	8½	.....
Casts	24/-	+3d
Cons. Diam. of S.W.A.	7	.....
De Beers Defd. Bearer	5½	—⅛
De Beers Pfd. Bearer	15½	+¼
Pots Platinum	8/6	—6d
Waterval	14/4½	.....
COPPER		
Bancroft	40/6	—2/6
Chartered	57/9	—9d
Esperanza	4/6	.....
Messina	7½	—⅛
Nchanga	13⅛	.....
Rhod. Anglo-American	94/9	—2/9
Rhod. Katanga	19/7½	+7½d
Rhodesian Selection	34/3	.....
Rhokana	36½	—1⅛
Rio Tinto	51½	—2½
Roan Antelope	24/7½	—1/6
Selection Trust	67/6	—3/1½
Tanks	6½	—⅛
Tharsis Sulphur Br.	5½	—⅛
TIN (Eastern)		
Ayer Hitam	27/9	+6d
Gopeng	7/6	—1½d
Hongkong	7/6	.....
Ipoh	22/3	+6d
Kamunting	7/3	+3d
Kepong Dredging	3/1½	.....
Kinta Tin Mines	11/9	+3d
Malayan Dredging	8/3	.....
Pahang	11/4½	—4½d
Pengkalen	10/3	—1½d
Petaling	9/6	+3d
Rambutan	17/9XD	+9d
Siamese Tin	5/6	.....
Southern Kinta	17/6XR	.....
S. Malayan	7/6	+1½d
S. Tronoh	10/3	—3d
Sungei Kinta	11/3	.....
Tekka Taiping	6/3XD	—1½d
Tronoh	7/9	+3d
TIN (Nigerian and Miscellaneous)		
Amalgamated Tin	13/10½	+3d
Beralt Tin	29/6	—9d
Bisichi	7/1½	.....
British Tin Inv.	19/-	—3d
Ex-Lands Nigeria	2/6	.....
Geevor Tin	12/6	—1½d
TIN (Nigerian and Miscellaneous) contd.		
Gold & Base Metal	2/4½	—1½d
Jantar Nigeria	8/1½	.....
Jos Tin Area	13/9	.....
Kaduna Prospectors	2/4½	—1½d
Kaduna Syndicate	2/4½	—1½d
London Tin	7/6	—1½d
United Tin	2/9	—3d
SILVER, LEAD, ZINC		
Broken Hill South	53/6	+2/3
Burma Corporation	2/6	.....
Consol. Zinc	45/6	—9d
Lake George	11/6	—6d
Mount Isa	50/7½	+1½d
New Broken Hill	33/9	—10½d
North Broken Hill	72/6	+1/6
Rhodesian Broken Hill	11/9	—1½d
San Francisco Mines	21/3	—1/4½
Uruwira	5/6	—4½d
MISCELLANEOUS		
BASE METALS & COAL		
Amal. Collieries of S.A.	48/9	+3d
Associated Manganese	38/-	—9d
Cape Asbestos	11/6	.....
C.P. Manganese	38/6	—1/6
Consol. Murchison	62/6	.....
Natal Navigation	2½	.....
Turner & Newall	105/-	—3/6
Wankie	18/6	—1/3
Witbank Colliery	4	—⅛
CANADIAN MINES		
Dome	$30	.....
Hollinger	$39½	+½
Hudson Bay Mining	$105	—2½
International Nickel	$116½	—5⅛
MiningCorpn.ofCanada	£6¼	—⅛
Noranda	$166	—2
Quemont	£8½	+⅛
Yukon	4/3	+1½d
OIL		
British Petroleum	75/6	.....
Apex	27/-	—1/-
Attock	45/-	.....
Burmah	5½	—⅛
Canadian Eagle	50/6	—9d
Mexican Eagle	20/6	.....
Shell	6½	—⅛
Trinidad Leasehold	30/4½	—1/1½
T.P.D.	24/-	—3d
Ultramar	27/6	—6d

COMPANY NEWS AND VIEWS

Bright Prospects for Ashanti Goldfields Corporation

The outlook for Ashanti Goldfields Corporation is good. But shareholders will not derive full benefits from the untiring efforts lavished on the mine.

This is confirmed by Major General Sir Edward L. Spear's annual statement in which he said that dividends in respect of the current year's operations are expected to be the same as has been distributed during the past two years, namely 1s. 7.2d. per 4s. stock unit.

What gives cause for justifiable optimism in the future is that the Eton Turner shaft is expected to reach its final depth of 4,360 ft. by this June and, although a great deal of work remains before the shaft can be commissioned, its contribution to the company's revenue in terms of hoisting the exceptionally high grade ore already known to exist at the lower levels of the mine cannot be far away. The persistent difficulty experienced in reducing working costs is now being tackled effectively and in the second half of 1954 these dropped to 84s. per ton milled. This represents a fall of 3s. 9d. per ton on the first half of the year and the chairman has pointed out that during the first six months of the current financial year costs have fallen by an average of a further 2s. 4d. per ton to 82s. 6d. per ton. Moreover, Sir Edward declares this improvement should continue.

The report and accounts of Ashanti Goldfields for the year ended September 30, 1954, were noted in these columns in our issues of March 4 and April 8.

Uruwira Minerals Completes New Mill

Uruwira Minerals, the Tanganyika incorporated base metals producer, has announced that its new mill at Mpanda, in the Western Province of Tanganyika, has now been completed, and by the end of June the mill should be in production. For the first few weeks it is anticipated that in the neighbourhood of 1,000 tons of lead concentrates will be produced a month, rising later to a minimum production of 1,500 tons a month.

The average contents of one ton of concentrates are : lead 48 per cent., copper 10 per cent, silver 45 oz., gold 22 grms. The value of this is rather more than £100 per ton of concentrates with lead valued at £100 a ton and copper at £300 a ton. Thus the values of the metals in the concentrates at these prices would be : gold £8 15s., silver £13 10s., copper £30 and lead £48. The present prices of lead and copper are somewhat higher than the figures taken. Thus, when full production has been attained, the value of the mineral exports from the mine are expected to be in the region of £1,500,000 per annum.

Last year, working only with the pilot plant, Uruwira Minerals produced 4,694 tons of lead concentrates, with an estimated value of £359,427. In 1953 the production was 6,174 tons valued at £484,265. The reason for the drop in last year's production compared with that of 1953 was the fact that considerable preparatory dead work had to be carried out underground such as the re-equipment of shafts, enlargement of galleries, etc., during which the production of ore had to be curtailed.

Regarding the completion of the new mill, it is obvious that when mining and treatment on such a scale are commenced, a few weeks' grace will be required for "running in", during which time somewhat less than full production is usually anticipated. When all the small troubles that are inherent in the starting of a new plant have been overcome, the full production of not less than 1,500 tons conc. a month should be attained.

The actual smelting of the concentrates is done at Hoboken in Belgium. The reason for this is that there are only two smelters in Europe which are interested in dealing with concentrates containing both lead and copper, one at Hoboken and the other in Germany.

It will be recalled that intimation of the foregoing was given in our issue of December 3, 1954, by our East African correspondent, who pointed out that to complete the construction programme Uruwira arranged a loan of £350,000 which is being guaranteed by the Government of Tanganyika against a charge over the company's property and assets held jointly by the Governments of Tanganyika and the U.S.A.

Lyndhurst Deep Pays 10 Per Cent More

The preliminary profit statement issued by Lyndhurst Deep-Level (Gold and Silver) for the calendar year 1954, shows that a dividend of 25 per cent per 1s. stock unit has been recommended. This compares with 15 per cent in 1953, and will be paid on June 3 to those registered on May 12.

The net profit for the year, after providing for all expenses, including depreciation charges of £1,377 (£1,467) and taxation of £51,500 net (£26,000), was £64,132 against £38,154 in 1953. The 25 per cent dividend will absorb the sum of £63,250 (£36,300), leaving the carry forward at £29,724 compared with £28,842 brought in.

South Witbank Coal Seeks Share Quotation

South Witbank Coal Mines will make application for a London quotation for its 10s. shares next week. The required prospectus statement was published this week and it is anticipated that a market in the shares will be available to-day. Previously dealings in South Witbank Coal Mines was carried on under Rule 163 (1) (e).

South Witbank Coal Mines was incorporated in South Africa in 1945 and came into production in May, 1948. At the present rate of production of 750,000 tons of saleable coal per annum, the life of the mine is estimated at 90 years.

During the year ended June 30, 1954, the dividend distribution totalled 17½ per cent per 10s. share on the issued capital of £422,500. There is prior charge of £253,400 of 5 per cent First Mortgage debenture stock. The total distribution for the current year is expected to be maintained at 17½ per cent.

C. P. Manganese's Lower Profits and Dividends

A preliminary profit statement from Central Provinces Manganese Ore Company for the year ended December 31, 1954, showed that net earnings, after providing for all expenses including U.K. and Indian taxtion of £1,265,000 (£2,200,000) was £896,497 compared with £1,054,690 in 1953. The contraction in profits was due, it is stated to a reduction in ore prices during the latter part of 1954 and to railing difficulties which prevented contracts from being fully implemented.

Dividend distributions totalled 2s. 10d. per 10s. stock unit tax free plus a bonus of 1s. 4d. tax free. These payments are to be made on the capital as increased by the scrip issue of £500,000. The carry forward at the end of 1954 was £228,790 compared with £232,294 brought in. Meeting, London, June 8.

Esperanza's Limni Mill Working Smoothly

Some 5,000 tons of pyrites concentrates from the Limni Mill have been sold at a satisfactory price and now await shipment, states the progress report on operations of Cyprus Sulphur and Copper Company, the wholly owned subsidiary of Esperanza Copper and Sulphur Company, in a progress report issued this week covering operations for the period ended March 31, 1955.

Total ore sales for the year ended March 31, 1955 amounted to 31,770 tons. Shipments of Kinousa ore were resumed in March on the reopening of the shipping season.

With regard to Limni, the report states that there has been considerable improvement in the working of the Limni Mill where the gravity regrinding and flotation sections are operating smoothly and with increasing capacity and efficiency. In fact, it has been found necessary to proceed with the installation of a further unit of the flotation section.

British Guiana Consolidated Pays 5 Per Cent

The preliminary profit statement issued by British Guiana Consolidated covering operations for the year 1954 recommends the payment of 5 per cent per 2s. share. No dividend was paid in respect of 1953. Vastly improved operating results are behind the company's re-entry into the list of dividend payers. In 1954 the dredge throughput mounted to 2,331,300 cu. yd. for a recovery of 21,026 oz. compared with 2,317,800 cu. yd. yielding 16,000 oz. in 1953. After providing for all expenses, prior charges, depreciation, interest and taxation, the net profit for the year was £12,203. The dividend will absorb £8,102 leaving the carry forward at £18,848 compared with £12,247 brought in.

Scottish Australian to Distribute 4d.

The Scottish Australian Mining Co. are to make a distribution from general reserve at the rate of 4d. per 4s. stock unit. This payment arises from surpluses realized on completed land sales and is not subject to tax. Additionally, the company recommended the payment of 4 per cent per 4s. stock unit on its £50,000 issued capital and both the dividend and the distribution to general reserve will be paid on and after May 10.

INTERNATIONAL NICKEL COMPANY OF CANADA

AN OUTSTANDING YEAR

DR. JOHN F. THOMPSON'S ADDRESS

The annual meeting of The International Nickel Company of Canada Limited was held on April 27 at Toronto.

Dr. John F. Thompson, Chairman of the Board of Directors, in the course of his address, said:

It is indeed gratifying to be able to report at this Meeting that 1954 was the best year in the history of the Company. Deliveries of nickel, net earnings and common dividend payments all attained record levels. Substantial progress was achieved in process and plant improvements, research and development activities were further strengthened, and exploration work in the never-ending search for new sources of nickel bore encouraging results.

For the fifth consecutive year, our nickel production was continuously maintained at capacity. Deliveries of 282,000,000 pounds of nickel in all forms were the greatest made by the Company in any year. Ore mined during the year and proven ore reserves at the end of the year were at new highs.

PRODUCTION AT CAPACITY

Besides increasing our production capacity to provide 24,000,000 pounds of additional nickel annually through 1958 for the United States Government stockpile, the Company contracted with that Government to deliver by August, 1955, a minimum of 4,500,000 pounds of nickel refined from concentrate produced by Sherritt Gordon Mines Limited in excess of the quantity it required for processing at its refinery. However, as a result of improvements to our procedure for treating this concentrate, International Nickel will be able to increase these deliveries to at least 5,000,000 pounds.

From International Nickel's five underground mines and open pit in the Sudbury area of Ontario came a record of 14,456,000 short tons of ore during 1954, resulting in the highest annual production of nickel and an impressive output of 12 other elements—copper, platinum, palladium, rhodium, ruthenium, iridium, gold, silver, cobalt, selenium, tellurium, and sulphur in the form of sulphur dioxide and sulphuric acid.

In the Chairman's Annual Address to Shareholders in 1948 it was stated that promising research on oxygen flash smelting of our sulphide concentrates justified further effort in this field. It is pleasing to report that this decision has been fully vindicated by the results of a methodical programme proceeding in stages from a small pilot plant furnace through furnaces of gradually increasing capacity until the present unit, with a daily rating of about 1,000 tons dry solid charge, was placed in operation. During the year over a quarter of a million tons of copper concentrates were oxygen flash smelted in our new furnace at Copper Cliff, with major economies including a saving of 60,000 tons of coal and with accompanying large-scale recovery of sulphur as liquid sulphur dioxide.

Construction of the $16,000,000 pyrrhotite treatment plant near Copper Cliff, which will employ the Company's atmospheric pressure ammonia leaching process, is proceeding on schedule. It is expected that the first commercial shipment of our high-grade iron ore pellets to the steel industry will be made before the end of the current year.

Production of electrolytic cobalt was initiated in 1954 at the Port Colborne, Ontario, refinery, marking the first commercial output in Canada of this form of cobalt. This is in accordance with our established policy of producing our metals and other products in the purest commercial grades to enable us to satisfy the most exacting requirements of industry.

As a result of aerial exploration work conducted by us for The American Metal Company Limited, we obtained a 25 per cent interest in a lead-zinc-copper discovery made by that company in 1954 in the Province of New Brunswick, Canada.

FINANCIAL

Net earnings established a new high of $65,295,000, not including $1,865,000 non-recurring capital gain from the sale of a subsidiary. These earnings were up $11,600,000 over 1953. The principal reasons for this increase were our substantially expanded output and the termination of excess profits taxation in the United Kingdom and the United States. Reduced expenditures for exploration and mine development and cost savings in the smelting of copper concentrates were further factors contributing to the improvement.

Preferred dividends of $1,933,000 were paid in four quarterly distributions at the rate of seven per cent per annum of the par value of the preferred shares.

Common dividend payments of $42,276,000 were the highest ever made by the Company.

On February 7, last, your Board of Directors announced that the dividend on the common stock for the first quarter of 1955 had been increased to 55 cents per share. This and the year-end extra dividend were in line, as I have pointed out at previous Meetings, with the desire of the Directors to pay out as large an amount in dividends as they consider wise in the light of their responsibility to assure the continuing supply of nickel and therewith the continuing progress of the Company.

The Company's capital expenditures of $22,257,000 were the second highest for any year and it is expected that they will continue at a high rate for some time to come. Such heavy expenditures are essential in large mining operations, such as ours, involving as they do the constant developing of mines, including sinking of new shafts and other mining activities, as well as the replacement of plants and equipment. Large sums also are needed for improvements in processes and equipment for the purpose of maximum utilization of our ores and increased efficiency. These latter expenditures constitute investments made with the expectation of a very satisfactory rate of return.

NICKEL, COPPER AND PLATINUM METALS

Price: As noted in the Annual Report, the Company announced on November 24, 1954, an increase in its price of electrolytically refined nickel to 64½ cents (United States) per pound, including the 1½ cents United States import duty which is paid by the Company. On the same date a general upward revision of the prices of mill and foundry products was announced.

Deliveries: International Nickel's deliveries of refined copper during the year amounted to 253,275,000 pounds. Canada continued to be a growing market for our copper and took about 45 per cent of the Company's output. The remainder was shipped to the United Kingdom, the United States and Continental Europe.

Price: The published price of primary copper in Canada and the United States during 1954 held steady on a 30 cents (United States) per pound basis. In the first quarter of 1955 the price of copper in these two countries rose to 36 cents (U.S.).

The copper price on the London Metal Exchange in 1954 opened the year at £232 per long ton, equivalent to 29.1 cents (U.S.) per pound, reaching a low on January 18 of £216, or 27.1 cents, and a high on October 5 of £310, or 38.8 cents. Copper was quoted on that Exchange during the first quarter of the current year as high as £368, equivalent to 45.9 cents (U.S.).

Our combined deliveries of platinum metals were approximately 263,000 ounces. The United States is the chief market, but Canada, the United Kingdom and several Continental European countries are also important consumers.

EXPLORATION, DEVELOPMENT AND RESEARCH

During the year an active exploration campaign for new nickel deposits was conducted by the Company in several parts of the world. In Canada, our work was especially concentrated in the Sudbury Basin of Ontario, in Manitoba, in Saskatchewan and in the Northwest Territories.

We began work in northern Manitoba in 1946 in the Lynn Lake area. Since that time the initial small-scale reconnaissance has been expanded into the present large exploration programme centered in the Mystery Lake region which is about 180 miles northeast of The Pas, Manitoba, and some 40 air miles north of Thicket Portage on the Hudson Bay Railway.

To keep ahead of to-day's accelerated scientific and technological progress, International Nickel's development and research work was intensified during the year. Additions were made to our research staffs which we plan further to augment during the current year. As part of our extensive development and research activities, we now maintain Technical Information Centres in 11 countries, the latest having been established last year in Johannesburg to serve South Africa and Central Africa.

OUTLOOK

The Company has been engaged over the last five years in a constant endeavour to increase and maintain its nickel production at the highest possible level. Along with this effort there has also been activity in preparation for the day when the world will have more nickel available than it will then require and new markets will again become the Company's immediate concern. The task of developing new markets, like the task of increasing the supply of nickel, is not something which can be done overnight but requires sustained activity over a period of years. Fortunately this activity does not in any way impede our production of larger amounts of nickel.

The year 1954 was a most successful one and the prospects for the current year are encouraging. The present demand for nickel and its extreme usefulness in many applications augur well for the future of the industry.

The report was adopted.

ASHANTI GOLDFIELDS CORPORATION

RECORD TONNAGE MILLED

PROSPECTS BETTER THAN FOR YEARS

The 58th annual general meeting of Ashanti Goldfields Corporation Limited was held on April 27 in London.

Major-General Sir Edward L. Spears, Bart., K.B.E., C.B., M.C., F.Inst.D. (the Chairman) presided and, in the course of his speech, said :

In the year under review, the process of equipping and developing the mine has continued according to plan. At the same time output has increased by 1,000 tons and a thousand ounces a month over the previous year. Last year's record tonnage was exceeded, and ore reserves substantially increased. The value of gold in the reserves brought in during the year was over £5½ million.

There is still much work to be done during the next two years, and the full benefit will not be obtained until the whole process of re-equipment has been completed. For some time to come we shall have to continue to supplement production from the main mine with lower grade ore from the outside mines. But I can affirm to you with even greater confidence than I did last year that the prospects of Ashanti Mine are better than they have been for years, and as far as we can foresee its future is assured for many years to come.

From the total profit before tax of £785,205, taxation has taken £445,969.

An Interim Dividend of 9.6d. per unit of stock was paid in November 1954 and we now recommend a Final Dividend of the same amount. This will make a total of 1s. 7.2d. for the year, the same as in 1953. As regards Dividends in respect of the current year, I cannot commit myself further than to say that unless circumstances arise which we cannot foresee, we expect to be able to distribute the same amount as in the last two years.

OPERATIONS

I now come to the year's operations on the mine and the results for the first six months of the current year.

I informed you in my speech last year that it was our aim to increase production to 16,000 ounces monthly for 25,000 tons treated. This target was duly reached, and, by the end of the year output had risen from 24,000 tons in the earlier months to 26,500 tons.

Gold production was 12,276 ounces more than in the previous year and tonnage treated, 297,690 tons, surpassed last year's record figure by 16,600 tons. In the current year we are planning to increase the proportion of higher grade ore treated and to produce 16,500 ounces monthly from the same tonnage, that is 26,500.

In the first six months of this period, good progress has been made towards this objective. Gold output has averaged 16,292 ounces monthly, and the indications are that further improvement will be achieved in the second half of the year. The figure for March, the latest available, was 16,367 ounces.

I referred last year to the efforts which my colleague, Mr. Outen, and I had made during our visit to the mine to study means of reducing costs. I am glad to say that the co-operation we received from Mr. Edwards and the staff, and the great efforts made by all concerned, resulted in a reduction of costs per ton mined, including development, by 3/9d. in the second half of the financial year under review.

For the whole year, the average was 85/10 ; but whereas for the first six months the cost rose to the very high figure of 87/9, in the second half year it was 84/-. This is still far too high, but it is an improvement.

To give the Mines Manager the maximum help to achieve a further reduction in costs and to increase productivity, the Board decided to engage the assistance of Production-Engineering Ltd. They began work on the mine in October last, and although much of the work they have done to date has been of a preparatory nature, mining costs, again including development, have fallen by an average of a further 2/4 per ton to 82/6 in the first six months of the current financial year. As the measures they are instituting are put progressively into effect, the improvement should continue.

After reviewing shaft sinking and development work, and giving his impressions following a recent visit to the property, the Chairman said:

In conclusion I should like to repeat that we have grounds for satisfaction. But pray do not expect anything but a gradual improvement, though we are bending our every effort to achieving results as rapidly as possible, and what have been really enormous efforts are bearing fruit.

The report was adopted.

BIBIANI (1927) LIMITED

SUCCESSFUL EFFORTS TO REDUCE COSTS

MAJ.-GENL. EDWARD L. SPEARS' REVIEW

The twenty-eighth annual general meeting of Bibiani (1927) Limited was held on April 27 at the Chartered Insurance Institute, 20, Aldermanbury, London, E.C.

Major-General Sir Edward L. Spears, Bart., K.B.E., C.B., M.C., F.Inst.D. (Chairman and Managing Director) presided and in the course of his speech said :

The most satisfactory aspect of the year's operation has been the reduction in costs in the second half of the year under review, and the fact that this improvement has continued in the current period.

The average price received for our Bullion fell during the year by 13/2d. per fine ounce to £12 10s. 2d. As a result the total gross return was lower by £14,163 although 2,813 ounces more were produced.

On the other hand mining costs were less by £13,185.

APPROPRIATIONS AND DIVIDENDS

The profit for the year before taxation is £141,712 compared to £130,365 for 1953. Profits Tax and Income Tax on these profits, however, require rather more, £74,694 against £63,000, so that the balance after tax, £67,018, is almost the same as last year. After paying an Interim Dividend of 2.4 pence per unit of Stock the Board now recommend a Final Dividend of the same amount making 4.8 pence for the year. These Dividends, less tax at the rate of 9/- in the £, take £27,500, and after providing for the appropriations to Fixed Assets Replacement Reserve and Mines Development to which I referred when dealing with the Balance Sheet, we are left with £4,518 to add to the balance carried forward.

PROGRESS AT THE MINE

I told you at our last General Meeting that all our efforts were being devoted to reducing costs. I am glad to be able to report that these efforts have resulted in a considerable improvement.

Although the average cost per ton mined, excluding development, was up by 8d. for the whole year compared to the year before, this was because the figure for the first six months at 39/- was up by 1/9 a ton.

In the second half of the year, when the measures to which I have referred began to take effect, it fell by 2/2 a ton to 36/10, which is 1/1 less than the average for the whole year, 1953/54. The result for the first six months of the current year, 33/1 a ton, shows a further fall of 3/9 compared to the preceding six months, and 4/10 for the whole of the preceding year.

The Consulting Engineer has referred in his Report to the reduction in the labour force by 600 men in the year under review. In the first three months of the current year, there has been a further reduction of 650, with a consequent saving in labour costs of £3,000 a month. At the same time efficiency has been improved by an increase of 25% in output per man, and average wages have increased by 8 per cent. over last year.

OUTPUT

The tonnage mined and treated in the year under review was 12,000 less than in the preceding year, but gold production was up by 2,800 ounces.

In the current year we expect to maintain production at 30,000 tons a month, for a gold yield of 6,250 ounces.

At the beginning of the period gold output was actually higher, and the average for the first six months was 6,350 ounces.

DEVELOPMENT

During the past two years comparatively little exploratory development has been done due to concentration on other work; and this must now be accelerated. In the current year effort is being concentrated on extending the Internal Shaft, which has now reached No. 22 Level. When it has reached No. 28 Level, exploration on Nos. 21 and 24 Levels will be started. The work will be pushed as rapidly as possible but conclusive results are not expected from it until next year, when the outlook for the future of the mine will be clearer.

Reserves are sufficient for several years at the present rate of production, so that there is ample time to find new ore at depth.

I visited your property at the beginning of the year and was very satisfied with the progress made since my previous visit.

The report and accounts were adopted and the dividend recommendation was approved.

KENTAN GOLD AREAS LIMITED

CONSIDERABLY IMPROVED POSITION

LORD GREY'S REVIEW

The Annual General Meeting of Kentan Gold Areas Limited was held in London on April 20, Mr. G. C. Hutchinson (Managing Director) presiding in the absence of the Chairman, **The Rt. Hon. Earl Grey.**

In his Review circulated prior to the meeting, the Chairman said: Mr. M. T. W. Easby and I returned in March from our visit to the Geita property, and Mr. P. S. Hammond, Johannesburg Resident Director of New Consolidated Gold Fields Ltd., Mr. J. M. M. Ewing, Mr. R. B. Smart, Dr. Pelletier and Mr. Campbell Pitt, all of New Consolidated Gold Fields Ltd., visited the property during the period March 23 to 28. I am happy to report a considerable improvement in the position of the mine.

CAPITAL EXPENDITURE

The programme has been reviewed again in the light of new developments, and anticipated expenditure in the half year to June 30, 1955, and now totals £46,236. In the year to June 30, 1956, it is anticipated that £84,000 will be required, and £44,000 in the year ended June 30, 1957. In order to provide additional standby power and to allow future consideration to be given to modifictaions to the Mill with a view to a moderate increase in milling capacity, provision has been made in the above figures for the cost of an additional 800 Kilowatt Power Unit.

The programme will be financed from the Geita Company's own resources.

ROPEWAY

Although reconditioning of the aerial ropeway took longer than expected due to manufacturing delays, it is now operating to the satisfaction of the Consulting Mechanical and Electrical Engineer, but as an insurance, it has been decided to instal an extra pylon on the steepest part in order to reduce the chances of runaways and thus maintenance costs.

DEVELOPMENT

The targets set twelve months ago for development of the Geita N.E. Extension have been broadly achieved. Four ore bodies have been intersected in the adit giving the following values:

From	*To*	*Width*	*Value*
1,608 ft.	1,616 ft.	8 ft.	4.30 dwt.
1,648 ft.	1,652 ft.	4 ft.	7.65 dwt.
1,685 ft.	1,713 ft.	28 ft.	4.59 dwt.
1,813 ft.	1,822 ft.	9 ft.	13.20 dwt.

It is proposed to speed up development on these ore bodies in order to have stopes available before the end of 1955.

As a further measure of concentration, it has also been decided to dewater, re-sample and diamond drill the Lone Cone Mine, situated at the S.W. extension of the Geita ore body, in the hope of providing further stopes in closer proximity to the Mill.

Terms for letting out of the Mawe Meru Mine on tribute have been agreed, and the tributors will start work on May 1, 1955.

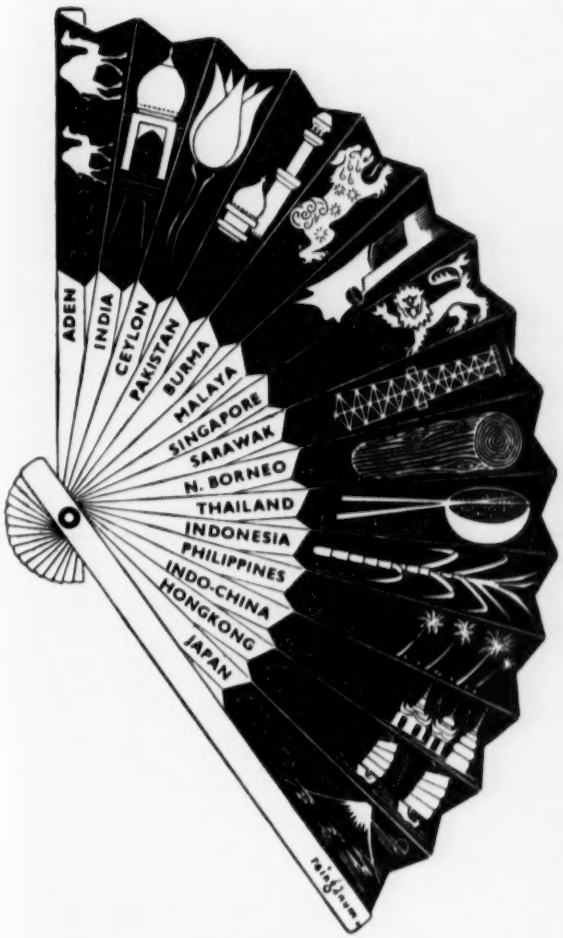
GEOLOGY

A better understanding of the Geita ore bodies has now been obtained as a result of the greatly increased development programme of the last two years, thus enabling more confident assumptions to be made. At Prospect 30 the original orebody which showed at surface and was worked by glory holes has now been worked out, but lateral extensions have recently been discovered on three sides of the quarry, running into the hillside under a barren cover.

Conclusion.—From the above, I feel sure that shareholders will join me in thanking both the Consulting Engineers, New Consolidated Gold Fields Ltd., and the Manager and Staff at the mine for the strenuous and successful efforts of the past year.

The Report and Accounts were adopted after the Chairman and Mr. M. T. W. Easby, A.C.A., had replied to shareholders' questions.

The retiring director, Mr. G. F. Webster, C.M.G., was re-elected; the remuneration of the auditors, Messrs. Cooper Brothers and Company, was fixed, and the proceedings terminated with a vote of thanks to the Chairman and directors.



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WANTED FOR BRITISH GUIANA, MINING ENGINEER. University Graduate. Aged 30-35 years, 5-7 years experience preferably open pit mining. To supervise stripping and mining operations. Home leave with passage paid every 3 years. Married man preferred, any children under 8 years of age. Good salary. Write Box 569, The Mining Journal, 15 Wilson Street, Moorgate, London, E.C.2.

METALLURGICAL ASSISTANT required by Mining Company in India. Applicant should hold a recognized metallurgical degree and preferably be single. Salary starts at £675 p.a. (inclusive of Overseas Allowance) rising to £725 in the third year, with cost-of-living and servant allowances of £141 p.a. for a bachelor. In addition an annual bonus is paid, and a Provident Fund is in operation. Three years' contract, with leave on full pay after 2½ years in India. Free furnished accommodation with fuel and light. Apply giving full particulars to Box 916, Walter Skinner Ltd., 20 Copthall Avenue, London, E.C.2.

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NATIONAL COAL BOARD invite applications for the superannuable appointment of a Mechanization Engineer in the Production Department at London Headquarters. Duties will include the study of mechanized methods of getting coal and ancillary operations at and immediately behind the coal face, stimulating and keeping in touch with trials of new machines in the pits and assisting in the development of new machines and their adaptation to varying conditions. The successful candidate will be required to live in the Midlands, and spend a considerable time in the coalfields, studying conditions underground.

Applicants must have experience of modern mechanization methods of coalmining and the problems associated therewith. A First Class Colliery Manager's Certificate is essential and a good knowledge of plant maintenance will be an advantage.

Salary, according to qualifications and experience, within the range £1,400 to £2,200 inclusive per annum.

Write, giving full particulars (in chronological order) of age, education, qualifications and experience (with dates) to National Coal Board, Establishments (Personnel), Hobart House, Grosvenor Place, London, S.W.1, marking envelope TT/960. Original testimonials should NOT be forwarded. Closing date May 26, 1955.

MECHANICAL ENGINEER (MINE) required by Mining Company in India for installation and maintenance of underground machinery and equipment. Minimum qualification O.N.C. (Mechanical). Applicant should have served recognized mechanical apprenticeship preferably with firm manufacturing mining machinery, with further experience in erection and maintenance. Salary starts at £1,000 p.a. (inclusive of Overseas Allowance) with cost-of-living and servant allowances of £255 p.a., plus annual bonus. Provident Fund in operation; free quarters with fuel and light. Three years' contract with leave after 2½ years in India. Apply giving full particulars to Box 919, Walter Skinner Ltd., 20 Copthall Avenue, London, E.C.2.

WIGAN AND DISTRICT MINING AND TECHNICAL COLLEGE

Applications are invited for the post of Head of the Mining and Geology Department, shortly becoming vacant through the retirement of Mr. Robert M. Chalmers, M.C., B.Sc., M.I.Min.E. Duties will commence on September 1, 1955, or such other date as may be arranged.

Candidates should possess high academic qualifications, preferably an Honours Degree in Mining; practical mining experience; and teaching experience, preferably in a Technical College or University.

Salary in accordance with Burnham scale for Heads of Departments Grade III (£1,215—£25—£1,365). A salary above the minimum of the scale may be paid to a suitably qualified candidate.

Further particulars and application form will be sent by the undersigned on receipt of a stamped, addressed foolscap envelope. Applications not on the form provided will be disregarded. Last date for receipt of applications: Thursday, May 19, 1955.

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Broken Hill Proprietary 1s. (May 25)
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General Tin Investments 5% *i* (May 4)
Gold Mines of Kalgoorlie 7½% (May 5)
Lake View and Star 9d. *i* (May 24)
Manganese Bronze and Brass 20% (June 4)
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Mining Men and Matters

Mr. J. W. F. Simpson, who has been the Assistant to the Overseas Mining Representative at South Africa House, in London, since 1951, has been appointed Mining Commissioner of the Pilgrim's Rest District of the Union. He expects to leave England this summer to take up his new duties. He will surely take with him to his new post the good wishes of the many friends he has made while in this country.

Mr. E. H. Browne, C.B.E., director general of production, the National Coal Board, has been appointed chairman of the West Midlands Division as from July 1 next in succession to **Mr. I. W. Cumberbatch.** Mr. Browne's position at National Headquarters is to be taken by **Mr. H. A. Longden,** the present production director of North Eastern Division.

Mr. J. A. Hooper has been appointed a director of L. M. Van Moppes and Sons. Mr. Hooper will remain as secretary of the company and of its two associated companies. **Mr. N. R. Smith** has been appointed a director of L. M. Van Moppes and Sons (Diamond Tools) Ltd. **Mr. R. H. Phillips** has been appointed a director of Diadust Ltd. These appointments took effect on April 1 last.

Mr. Austin Hopkinson, who founded the firm bearing his name, retired last month after 50 years of service. **Mr. H. J. Holton** has also resigned. Accordingly, **Mr. Austin Voorsanger** has been elected chairman of Austin Hopkinson and Co. Ltd., and **Mr. A. J. Holton,** son of the retiring director, has been elected to the board.

Head, Wrightson and Co. have announced that they have acquired from The British Metal Corporation the entire share capital of Colliery Engineering of Sheffield and its subsidiary company, Cupola Mining and Milling. Following the acquisition, the board of Colliery Engineering Ltd. has been reconstituted as follows: Mr. Peter Wrightson (chairman), Mr. L. W. Needham (managing director), Mr. H. Cussons and Mr. S. A. Casson (directors). The board of Cupola Mining and Milling Co., now a direct subsidiary of Head, Wrightson and Co., is as follows: Sir John Wrightson, Bt., has been appointed chairman, Mr. A. Chilton as managing director with Mr. Peter Wrightson, Mr. L. W. Needham and Mr. H. Cussons as directors.

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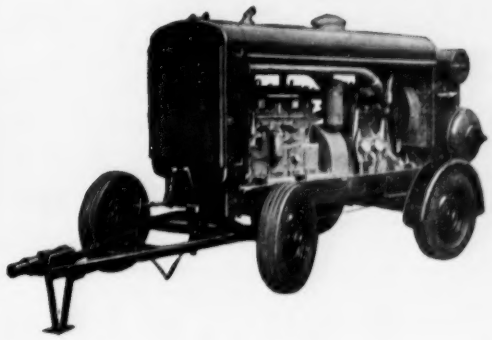

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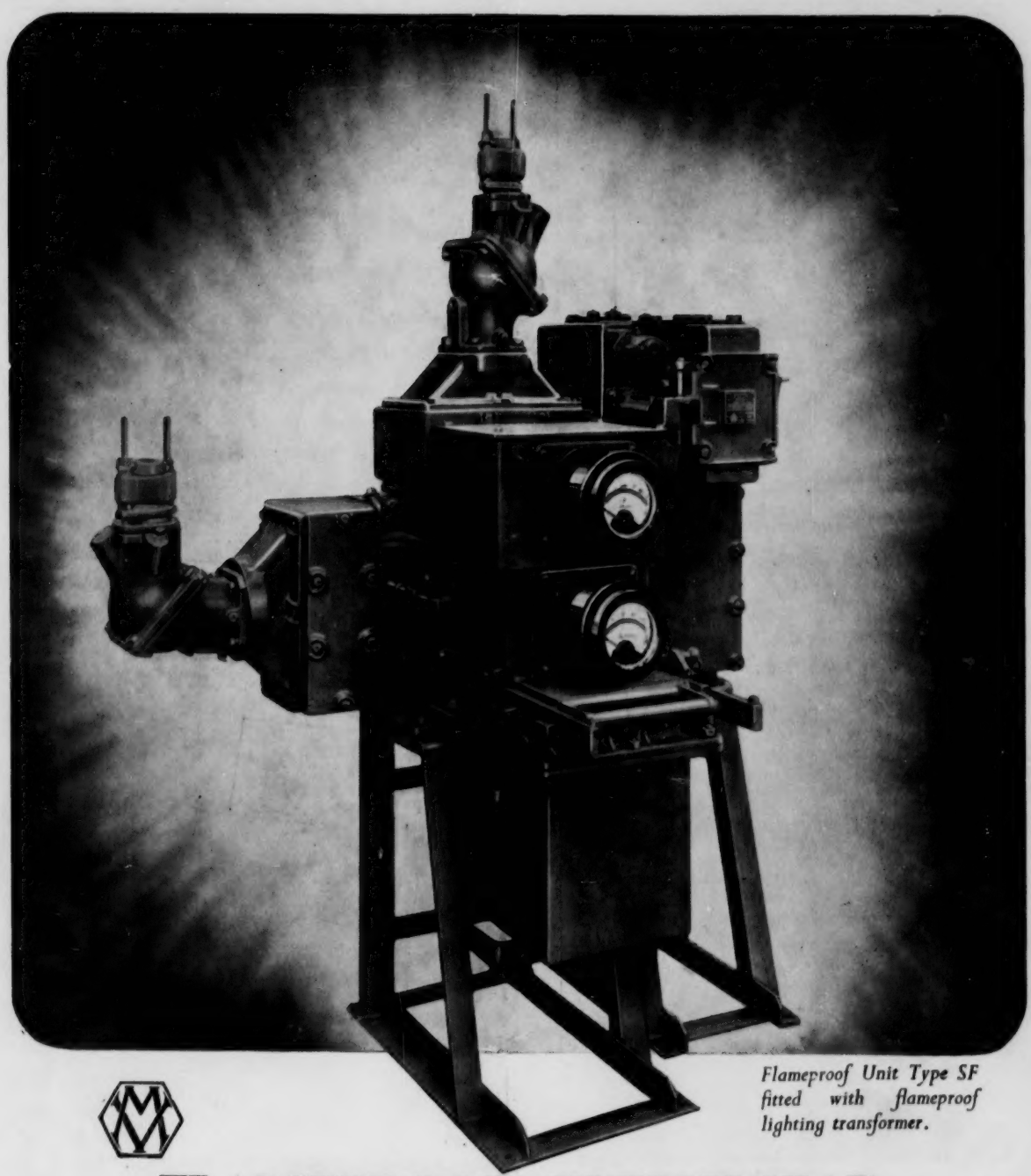

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